

AFRICA

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*WITH MANY ILLUSTRATIONS, MAPS
AND DIAGRAMS*

SIXTH EDITION REVISED



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PREFACE TO THE SIXTH EDITION

RECENT changes in the political geography of Africa, notably in West Africa, have necessitated modifications to both text and maps. Where a change in political status is pending at the time of writing, this is noted in the text. In connexion with new names that have emerged, some confusion may arise over the name "Sudan". In this book "Sudan" (without the definite article) is used for the republic lying south of Egypt, for the great savanna zone south of the Sahara the term "the Sudan" is employed.

The opportunity has been taken to make other modifications and corrections, and the spelling of a number of place names has been brought into line with current usage.

This edition has had the advantage of the valuable co-operation of Dr R. J. Harrison Church, of the London School of Economics, as well as of further criticism and suggestion from Dr T. J. D. Fair, of the University of the Witwatersrand.

L. S. SUGGATE

October 1959

For this reprint minor changes in the text and maps have been made, chiefly but not wholly arising from the rapid political changes in Africa, more of which are pending.

L S S.

January 1961

EXTRACTS FROM THE PREFACE TO THE FIRST EDITION

THIS book is designed to meet the needs of those who are carrying the study of the geography of Africa beyond the Matriculation stage, and it is hoped that it will prove useful not only to students preparing for subsequent university examinations, but also to the increasing number of those interested in the subject for other reasons.

That rapid changes have taken place and are still taking place in Africa is common knowledge, but in order to appreciate their extent and variety it is necessary to consult many books and periodicals that are often not generally accessible. Moreover, the conditions of economic and social developments now in progress are a proper field for geographical study. In the following pages the attempt has been made to bring together much scattered material and to present a comprehensive and balanced study of Africa in the light of modern geographical thought. The economic aspect has received most emphasis, but this seems to be of greatest importance in dealing with a developing continent like Africa. Effort has been made, however, to give adequate treatment to physical and regional geography and to suggest the historical and human background of "changing Africa." Western Europe is largely interested in Africa as a source of raw materials and as a market for manufactured goods, and the impact of Europe upon Africa has raised many problems, not the least of which is the future of the Negro race in the modern world. The importance of some parts of the continent is due to the presence of great resources in mineral wealth, and it would be interesting to speculate upon what would happen to such regions should their mineral wealth become exhausted. It is within the province of geography to provide the data for the consideration of problems such as these, and it is hoped that it will be found that this aspect of the study of Africa has not been neglected.

L. S. SUGGATE

March 1929

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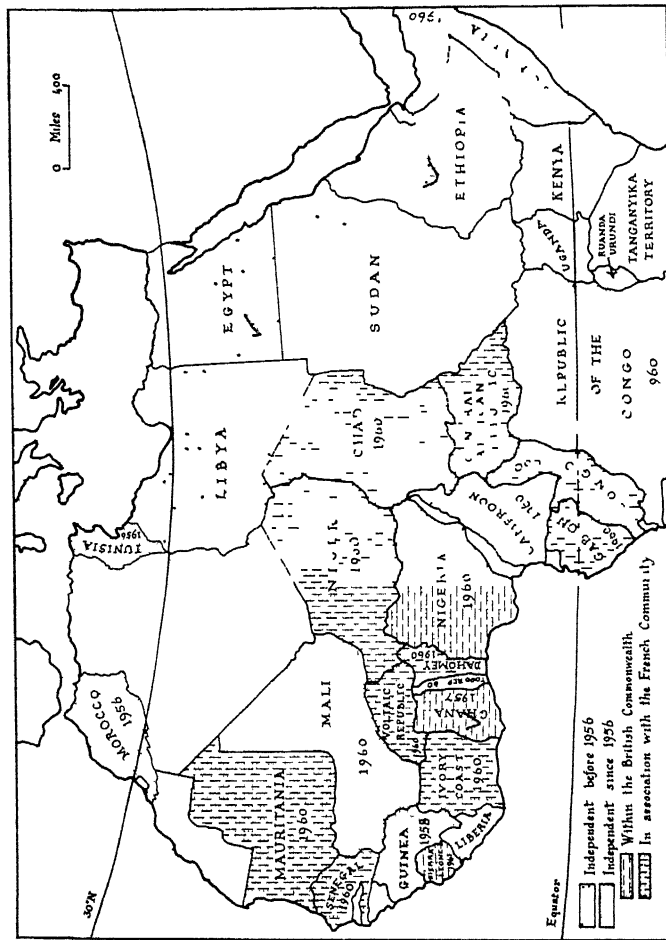
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INDEPENDENCE COMES TO MANY AFRICAN TERRITORIES

Between Nigeria and Cameroon are two strips of British Trustee-ship territory, the northern area has voted to join Nigeria and the southern to join Cameroon, their final status should be determined in 1961. Tanganyika Territory is due for independence by the end of 1961 and will be followed later by Kenya and Uganda. Independence for Ruanda-Urundi is planned for 1962. In addition to those shown, Madagascar became independent, in association with the French Community, in 1960. The association of some states, notably Dahomey, Ivory Coast, Niger, and the Voltaic Republic, with the French Community is very slight and mainly connected with economic and technical aid. In the early part of 1961 Mali severed her last links with the French Community.



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CHAPTER I

GENERAL PHYSICAL GEOGRAPHY

THIS vast, compact continent, covering an area of approximately 11,500,000 square miles (about three times that of Europe), is joined to Asia by a relatively narrow isthmus. Until this isthmus was cut by a canal in 1869, Africa, situated between the Atlantic and Indian Oceans, and with great latitudinal extension, constituted the most serious obstacle to the sea-borne trade between Europe and the East which sprang up in the years following the historic voyage to India made by Vasco da Gama in 1497. It is an illuminating comment on the general geography of Africa that for more than three centuries after this event, in spite of many trading stations on its coast, only insignificant progress was made in the work of opening up the interior of the continent. Africa was, in fact, a backwater of the earth's surface, the interior of which awaited the explorers of the nineteenth century and the subsequent interest of several Great Powers before its surface could be mapped with reasonable accuracy and its economic possibilities determined. That knowledge of the continent should so long have been confined in the main to coastal areas arose to a large extent from its general physical conditions, its build, drainage, climate, deserts, forests, diseases, and difficult communications.

Cape Blanco, in Tunisia, $37^{\circ} 20' N$, is the most northerly point, and Cape Agulhas, $34^{\circ} 40' S$, is the most southerly point, so that the equator divides the continent almost equally as regards mere latitudinal extension, but from the point of view of area, owing to the great westerly projection lying about the Tropic of Cancer, there is roughly twice as much of the continent north of the equator as there is south of it. Nevertheless, arising from this approximately equal latitudinal division, there is considerable similarity in the arrangement of climatic regions north and south of the equator. It is an important feature of Africa that no part reaches

the essentially temperate latitudes—that is, those latitudes in which cool winters occur at sea-level. It will be noted from the map that the bulk of the continent lies in east longitude, and that the prime meridian passes through the middle of the Atlas region, cutting the coast of West Africa just east of Accra, which is in Ghana.

The coast is very regular in outline, and there is a noteworthy absence of peninsulas and arms of the sea. Apart from the Gulf of Guinea, which is hardly a gulf in the ordinary sense of the term, and the Gulf of Suez in the north-east corner, the only prominent openings are the Gulfs of Gabes and Sidra in the north, which can scarcely be described as openings that invite penetration to the interior. The shape of Africa, indeed, neither permits the penetration of oceanic influences nor that of ships, the latter disability being aggravated by the general absence of good harbours on the growing coastal plains.

RELIEF AND STRUCTURE

Africa is relatively simple in shape, in relief, and in structure. The narrow continental shelf is related to the steep face which the continent generally presents to the sea and the faulting that has produced its general shape. Not only does the 100-fathom line closely preserve the shape of Africa, but this is true also of the 1000-fathom line, suggesting that the continent has had a prolonged existence without serious disturbance. The structural unity of Africa is illustrated by the extensive outcropping of the ancient crystalline foundation of the continent over large areas both north and south of the equator. It is thought that the greater part has been a land area since the Pre-Cambrian period and that the disturbance it has since suffered has been mainly due to warping, fracturing, and faulting with resulting 'swells,' basins, block mountains, and rift valleys. Thus have been produced great stretches of higher plateau where ancient rocks crop out, broad basins largely filled with continental deposits eroded from their margins, and uplifted blocks, fault scarps, and tectonic trenches, the last being remarkably illustrated in Eastern Africa.

The orographical map shows that, apart from the young folded system of the Atlas, Africa consists essentially of a great plateau

with considerable diversity of relief. A broad distinction in altitude may be made, however, between the two limbs of the continent lying one on each side of an irregular line drawn from

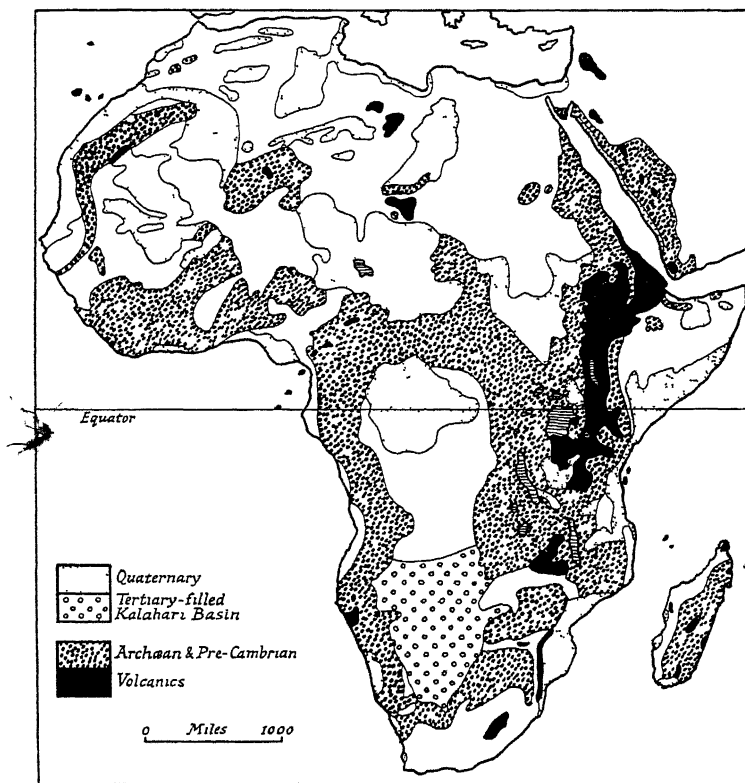


FIG. 1. SWELLS AND BASINS IN AFRICA

The swells are illustrated—though only in part—by the outcrop of Archaean and Pre-Cambrian rocks, the basins by the areas filled with Quaternary deposits and by the Kalahari Basin. The Quaternary areas include coastal deposits, alluvials, and desert sand.

Based on a map by K. S. Sandford

Benguela north-eastward round the southern border of the Congo basin and along the western edge of the Lake Plateau to a point a

and along the northern rim of the Congo basin. Sometimes relatively recent volcanic rocks are superimposed, as in some of the peaks of Dar Fur and more notably in the Cameroons, where the Peak of Cameroon attains a height of more than 13,000 feet, associated with which are the volcanic islands of Fernando Po, Principe, and São Thomé. Otherwise Primary rocks prevail except where a relatively recent extension of the sea is indicated by a large area of Cretaceous and Tertiary rocks stretching from the Moroccan Sahara eastward to the Lower Nile and again by the

F



FIG. 3. FARM IN THE INYANGA DISTRICT, SOUTHERN RHODESIA

This is towards the high eastern border of Southern Rhodesia, showing high, open plateau country

High Commissioner for Southern Rhodesia

Senegal and Gambia and round the Middle Niger. A series of large depressions is a prominent feature of this northern plateau. The depressed areas around Shott el Jerid in Tunisia and the Tuat oases have no outlet to the sea, as is also the case with the vast basin of Lake Chad, which is now probably only a remnant of a larger inland lake. The lakes by the Middle Niger (*e.g.*, Lake Debo) suggest a similar basin now drained by an active river, the Lower Niger, that cut back from the Gulf of Guinea through the plateau rim; and the great swamps of the Bahr el Ghazal in the Nile basin record the comparatively recent draining of a lake by that river. Where the Congo falls to the Atlantic, in its lower

course between Leopoldville and Matadi, by a relatively narrow cutting in the rim of Central Africa, the rapids indicate the relatively recent draining of a great inland lake round the Middle Congo, the basin of which is plainly brought out by the orographical map.

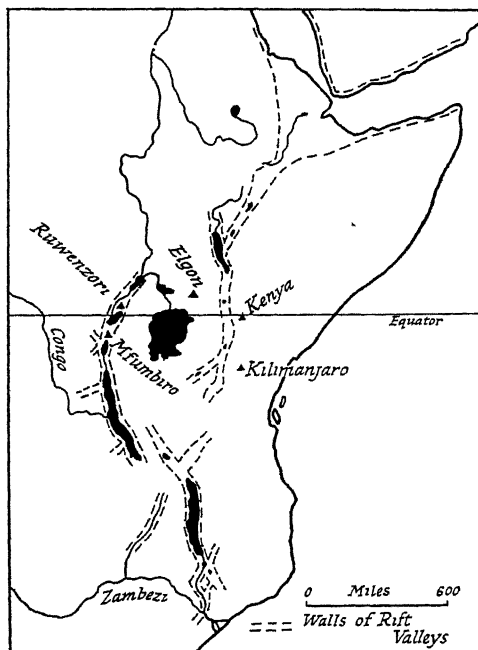


FIG. 4. THE GREAT RIFT VALLEY SYSTEM, SIMPLIFIED

Note the eastern and western branches, diverging from the Nyasa section
Except for the horst of Ruwenzori the peaks shown are volcanic

The southern limb of the plateau reproduces many features of the northern, though at a considerably higher elevation and with some special features of its own. The high rim can be traced through Namaqualand and Damaraland northward to the Bihé plateau, round through the Katanga district of the Upper Congo, through the east of Rhodesia to the Drakensberg and Nieuwveld Mountains. The rocks are largely ancient sedimentary rocks, often

sandstones and shales, but there are enormous areas of igneous rocks, both intrusive and volcanic, of widely varying age. The great band of granite, gneiss, and schists, for example, that covers immense areas in the southern part of the northern plateau reappears to the south of the Congo basin in Mashonaland and Matabeleland and south of the Limpopo, as well as in the high rim near the west coast. Much of this is metalliferous, especially in copper, and gold occurs in quartz veins. The gold-bearing 'banket' of the Rand, however, is an ancient conglomerate. Volcanic activity has been pronounced at many periods—the Kimberley diamonds, for example, occur in ancient volcanic 'pipes,' while the Victoria Falls on the Zambezi are due to a belt of Tertiary basalt

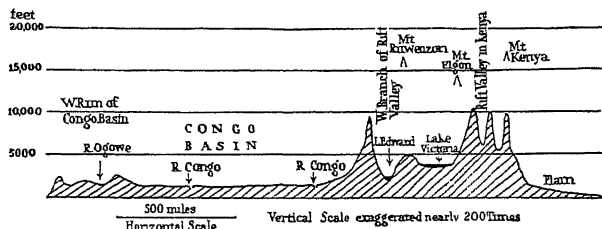


FIG. 5 SECTION ACROSS AFRICA IN THE LATITUDE OF THE EQUATOR

Note the low plateau character of the Congo basin and the two branches of the Rift Valley. The volcanic peak of Kenya rises to the east of the Rift Valley. Lake Edward is actually just south of the equator.

Two important basins are found in this southern plateau. The Ngami basin, in the lowest part of which are the Makarikari Salt-pans, is covered with younger rocks derived from the surrounding highlands, and is now being tapped by a tributary of the Zambezi. Farther south, the Karoo basin, of greater elevation, and extending from the Nieuwveld Range to the Vaal, is drained by the Orange; it is a gentle depression in the rocks of the plateau.

The lofty eastern part of the plateau includes the Lake Plateau and the Abyssinian Highlands. This region is specially marked by the Great Rift Valley system, a structural feature thought by the late J. W. Gregory to be due to tension leading to the sinking of long tracts of country between faults (or a series of parallel step faults). It is now known, however, that long sections of this system

do not conform to this tension theory and are thought to be due to fracturing under compression, leading to the uplift of the plateau on the two sides of the intervening wedge, which is kept down by the crust on each side rising over thrust faults. It is possible that both modes of formation are involved.

The Rift Valley system may be regarded as beginning in Israel, where it is occupied by the Jordan and the Dead Sea, it passes



FIG 6 LAKE NAIVASHA, RIFT VALLEY, KENYA

The photograph was taken across the golf links, in the distance is the wall of the Rift Valley

Dorien Leigh

down the Red Sea, turns south-westward through Ethiopia, where it is marked by the Hawash river and Lake Abaya, and continues by Lake Rudolf through Kenya. The continuity is broken in Tanganyika Territory, but the trench reappears by Lake Nyasa and in the Shiré valley. From the northern end of Lake Nyasa a branch passes, though discontinuously, northwestward through Lake Tanganyika, and then continues northward to Lake Albert. The depth of this series of trenches is very variable, and the steep, cliff-like walls are not everywhere very obvious, although they are often very well marked on the shores of the lakes. The mountainous confining walls are a striking feature of the topography in

Kenya. Associated with this great series of fractures were enormous volcanic outpourings, especially to be seen in a great area lying north-east and east of Lake Victoria, where the volcanic peaks of Elgon and Kenya occur. Superimposed on the ancient rocks so characteristic of Africa is the great basaltic area of the Abyssinian Highlands, a large part of which reaches over 10,000 feet. Vulcanism is not, however, everywhere evident in con-



FIG 7. BUKAVU (COSTERMANSVILLE)

Bukavu is at the southern end of Lake Kivu, in the Western Rift Valley

Documentation C I D Bruxelles

nexion with these rift valleys, and in the very deep trench occupied by Lake Tanganyika (the bottom of which is 2150 feet below sea-level) it is absent. Lake Victoria is in the plateau block left between the eastern and western branches of the Rift Valley, and is in a relatively shallow depression where the crystalline block has sagged, not in a fault valley. Crystalline rocks crop out again in the Somali peninsula.

The plateau, of which Madagascar is an isolated and dissected portion, falls to the Indian Ocean by a series of step faults, and the coast is marked by a continuous plain of varying width from

Natal to Cape Guardafui, in which relatively recent deposits occur. This is one of the few extensive belts of coastal plain in Africa.

It is clear from the foregoing that Africa is built mainly of an old crustal block or shield land of early geological date, and that the great Tertiary movements that are so prominently shown in the mountain belts of the northern continents affected it but little. Pressed against the southern edge are some minor fold mountains—*e.g.*, the Swartberg, the Langeberg, and the Olifants Mountains. The Atlas Mountains of the north-west are geologically connected with the great young folded mountains of Europe. Here two main ranges can be distinguished. The more prominent is the Great or Snowy Atlas in Central Morocco, where a maximum elevation of more than 14,000 feet is reached; this range, like the parallel Anti-Atlas to the south, is abruptly broken by the Atlantic to the west. Eastward the range continues as the Saharan Atlas, and terminates at Cape Bon in Tunisia, which points to an earlier connexion with the fold mountains of Sicily and Italy. The northern ranges converge eastward on the southern ranges, but in the west the Tell or Maritime Atlas, after running parallel to the Mediterranean coast, bend northward through Er Rîf. They fall by terraces to the coast, where, however, a low, broken coastal range can be distinguished, especially in Algeria.

Between these great parallel ranges, which in general are of Jurassic limestone and younger rocks, lies the Plateau of the Shotts, a series of depressions of internal drainage and varying elevation, with sheets of sand and salt lakes. An ancient core is sometimes in evidence, and in Morocco there is a considerable development of Archæan and Primary rocks, as well as of granite and ancient eruptive rocks. Relatively recent volcanic activity is indicated along the Mediterranean coast, and again in the islands of the west. On the south the Atlas fall steeply to a discontinuous depression indicated by the Wadi Draa and the depressed area round the Shott el Jerid.

Apart from the Atlas region and the folded mountains of the extreme south, the bulk of Africa was probably once part of the ancient continent of Gondwanaland, which included the Brazilian plateau, Africa, Arabia, the Deccan, and the western plateau of

Australia. These are blocks of relatively ancient and unfolded rocks separated either through the subsidence of those parts of the former continent that are now covered by the Atlantic and Indian Oceans, or more probably as a result of 'continental drift.'

A number of major erosion cycles are recognized in Africa, each marking a long period of continental stability. In Southern

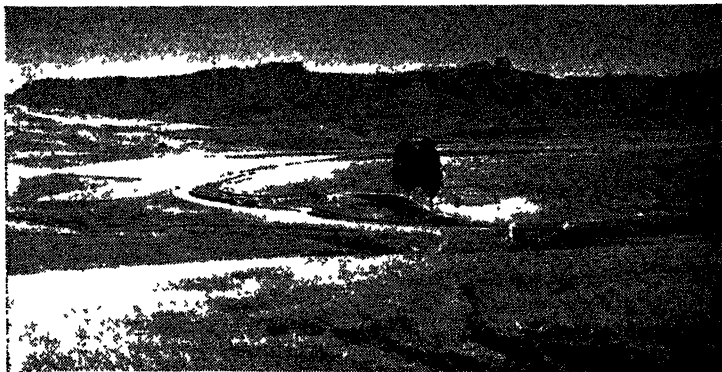


FIG. 8. A SECTION OF THE DRAKENSBERG, NATAL
Illustrating the Great Escarpment Mont aux Sources lies behind "The Amphitheatre," seen in the middle of the section

Africa four major erosion surfaces are distinguished, the first of which is related to the period before Gondwanaland split up, following which the continent developed sags and swells and a second major erosion cycle occurred. The third is related to the Miocene period, and a later fourth one has been studied. At the present time erosion is causing the retreat of what is called in Southern Africa the Great Escarpment, a remarkable feature that is referred to later in Chapter X. The last major disturbances to the continent appear to have begun in the middle of the Pleistocene period, when the Great Rift Valley system of East Africa began to develop

SOILS

The study of African soils has not as yet advanced very far except locally, as in the south of the continent, but it is generally

recognized that there is no considerable proportion of rich soils. The inter-tropical zone is largely characterized by well-leached red soils, including laterite derived from crystalline rocks in very wet areas of West Africa, the rim of the Congo basin and Eastern Madagascar, while the savanna zone commonly has tropical red earths, loamy but often sandy. A relatively narrow zone of chernozem stretches across the continent towards the north of the Sudanese zone into the Gezira Plain, and is again found in some districts of the Transvaal and Southern Rhodesia, where it is locally known as 'black-vlei soil'. Desert soils are often rich in carbonates and, when irrigated, very fertile. Brown and chestnut soils, poor in lime, are found in certain areas, notably over much of the east of Southern Africa and in a belt along the Northern Sudan. Alluvial soils are prominent along the Lower Niger, by the Congo and its tributaries, and in the Nile valley.

DRAINAGE

The river-system and lake-basins of Africa present many interesting features. Some important rivers run in a direction that carries them away from the nearest coast, notably the Niger, the Zambezi, and the Orange. The Niger, the Orange, and the Congo also show a notable constriction of their basins round their lower courses. Most of the shorter rivers take much more direct routes to the sea—*e.g.*, the Senegal, the Volta, the Ogowe, and the numerous rivers of the east coast—a fact no doubt associated with the largely peripheral rainfall of the continent. But no African river of importance exhibits a reasonably evenly graded course, although the middle courses of the Niger, Congo, and Nile are of remarkably slight gradient. Relatively near to its mouth each of the great rivers exhibits an impediment to navigation in the shape of rapids and falls, and these are part of the chief evidence of comparatively recent interference with the earlier drainage-lines of the continent. In general, the major rivers flow for much of their courses over the plateau-surface, and sooner or later each falls over the edge to continue at a lower level.

The existence of a high rim to the continent results in general in a heavier rainfall on the seaward side, and the relatively short and steeply graded peripheral rivers are very actively cutting back

into the plateau, in consequence of which they are busy capturing drainage previously flowing from the rim towards the interior. A careful study of a good physical map of the continent will illustrate the process of river-capture in its various stages. Heavy rainfall on the seaward side of the rim of the continent leads to the development of short, active rivers that rapidly eat into the plateau, many examples may be seen along the Guinea coast—e.g., in Sierra Leone and Liberia—and along the eastern coast, as in Natal. Next a coastal river secures a footing on the inside of the rim, as exemplified in the Limpopo. At a still later stage, an active river, having cut through the rim, captures some of the drainage flowing towards the interior. Thus the Upper Senegal and the upper section of the Black Volta, both of which formerly ran to the Niger, have been diverted as a result of such capture. A further excellent example is seen in the Upper Kunene, which formerly ran into the Etosha Pan and now flows to the west coast just north of Cape Frio. The next stage is the capture of a main river by a specially active coast stream. Fundamental changes in drainage follow, and the present courses of some of the great rivers of Africa are the result of such diversions. In the case of the Niger the rim of granite that runs parallel to the Guinea coast is relatively narrow at Busa, where the falls occur at which Mungo Park lost his life. It would appear that an active coastal river ate through the rim at this point, and, rapidly excavating its bed in younger and softer rocks to the north, carried away to the Gulf the Niger drainage that formerly emptied into the great inland lake that once existed in the region between Segu and Timbuktu. Rapids (the Kebrabasa Falls) occur on the Lower Zambezi just above Tetē, showing where a coastal river entered the plateau and, with the assistance of a heavy rainfall, first cut back to capture the Luangwa and then worked back to the basalt ledge marked by the Victoria Falls. Just above this point it was able to capture the water of several rivers that formerly ran to Lake Ngami and the Makarikari Salt-pans.

The process of capture is still rapidly going on. The coastal rivers of West Africa are every year capturing more and more of the Niger water. They have already seriously diminished the quantity of water going towards the Sudan, so that even within the

last century the floods of the Lake Debo region have very considerably lessened. The Ubangi and, especially, the Benue are making serious inroads upon the water that goes into Lake Chad. The Ogowe (Gabon) is making a bid for some of the Middle Congo water. The Zambezi, which has already diverted much drainage from Lake Ngami, seems now to be capturing the bulk of the rest by means of its Chobe tributary, which joins it on the right bank some way above the Victoria Falls. Livingstone described Lake Ngami as a vast sheet of water, which it certainly is not now, and the Makarikari lake is believed to have dried up about 1820, leaving hippopotami, crocodiles, and fish stranded. Even as late as the middle of the nineteenth century the Chobe occasionally flowed towards Lake Ngami, and when the Victoria Falls were a few feet higher this region was doubtless a vast lake. Similarly, numerous rivers in the south-east corner are filching water from the Orange and Vaal, while it may be added that there is evidence that some of the Tell rivers of the Atlas region have cut back to capture streams that formerly flowed into enclosed basins on the plateau.

While the draining of the Congo lake, the shrinkage of Lakes Chad and Ngami, and the process of diverting water from the interior must have contributed to the aridity of much of the continent, such rainfall records as have been accumulated lend little support to the view that significant desiccation in the sense of a reduction in the rainfall is at present taking place. The problem is complicated by the degradation of the natural vegetation and the soil erosion that result from the agricultural and pastoral practices of the African, so that the so-called 'advance of the desert' in, for example, the Northern Sudan, may well be the result of land use. This may also help to explain why much of South Africa is desiccated by hot winds from the Kalahari even in years of 'normal' rainfall.

In considering river development in Africa, it is of interest to note that during the Great Ice Age, which so profoundly modified the physical geography of the northern continents, Africa was certainly not unaffected, although no ice-sheets spread over it. Wet and dry periods alternated, and during the former (which coincided with the southward advances of the northern ice) the

drainage was more vigorous, and the lake-levels rose, while the vegetation distribution was different from that of to-day. Much of the wadi drainage from the highland areas of the Sahara uses valleys that were developed during this period.

The rivers of Africa generally present three important features that have had great influence on the opening-up of the continent and the development of its economic life

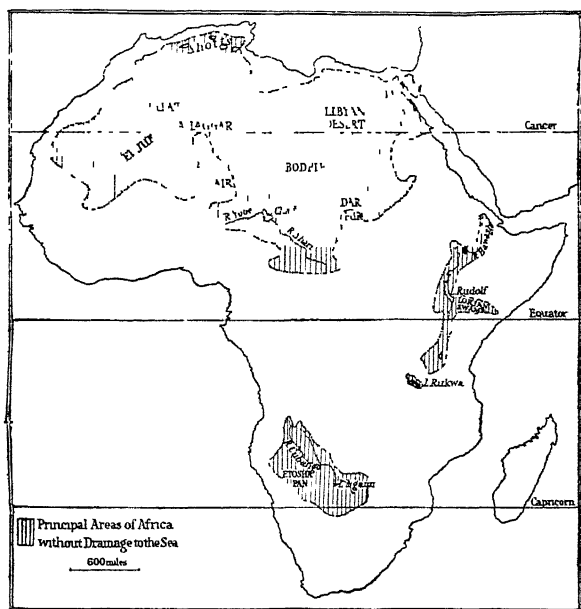


FIG. 9. THE CHIEF AREAS WITHOUT DRAINAGE TO THE SEA.

In addition to the areas of inland drainage shown, there are large tracts, as in the Eastern Horn of Africa, with little surface water.

(a) The occurrence of falls and rapids, often covering considerable stretches of the river-bed, is very noteworthy in the four great rivers, Nile, Congo, Niger, and Zambezi. These are associated with the structure and river development of the continent, and have hindered interior penetration and economic development.

(b) The régime of the rivers is determined by the rainfall, which, being seasonal in character over the greater part of Africa, leads to big differences between high and low water, and thus affects both navigability and opportunities for agriculture. The Nile and the Niger are good examples.

(c) The great African rivers usually have deltaic mouths, mainly due to the absence of the strong tidal effects which are common where the continental shelf is well developed. The strong current of the Congo has hindered the development of a typical delta at its



FIG 10. JUNCTION OF THE BLUE AND WHITE NILES

The Blue Nile bridge carries the railway at Khartoum

Sudan Government

mouth, but the Niger, Nile, and Zambezi provide striking examples. These deltas are normally unhealthy, and in tropical Africa are usually associated with mangrove-swamps.

Fully a third of Africa has no drainage to the sea, and its rivers are not comparable as lines of communication with the great waterways of Europe, Asia, North America, and South America. The *Nile* is the longest African river, with a course of some 3500 miles if the Kagera of Lake Victoria be included. The sudd of the Bahr el Jebel section, the six cataracts of the middle course, and the periodical low water in the lower course are all hindrances to navigation, nevertheless, there is a good deal of local sectional

traffic, by canoe in Sudan and by small sailing-craft in Egypt, while Government steamers are met with as far up as Juba, in Southern Sudan.

The *Niger* (2600 miles long) is mainly useful in summer, when the rainy season occurs. At this season it carries a good deal of traffic in the Sudan between Kulikoro and Kabara, the port of Timbuktu, and in Nigeria between Jebba and the delta, the intervening section being obstructed by a number of rapids. Its tributary, the Benue, is very useful at the same time of the year, being navigable up to Yola, but in the dry season it has very little water, and can be used only by the smallest craft.

The *Congo* (nearly 3000 miles long) and its many long tributaries provide nearly 11,000 miles of navigable waterways in Central Africa above Leopoldville. The main stream does not vary in volume so much as the other great African rivers, and there is no obstruction for a thousand miles below the Stanley Falls, while it is navigable in several sections above this point. The occurrence of the Livingstone Falls has been a most serious hindrance to the development of this part of the continent, as the railway round them to the port of Matadi involves a break of bulk.

The *Zambezi* (1300 miles long) again has only limited value. The Victoria Falls and the Kebrabasa Falls are serious obstacles, and the lower course is liable to disastrous floods in summer, and has little depth in winter. Since railways have been established here the port of Chinde on the delta has ceased to be important.

Of the remaining rivers of Africa the *Senegal* and the *Gambia* are perhaps the most important from the point of view of navigability, they are specially useful during the summer flood season. There is local value, too, in the same season in the lower courses of many of the smaller rivers, such as the *Volta*, *Limpopo*, and *Rufiji*, while the *Yobe* and *Shari*, draining to Lake Chad, are also useful. The *Orange*, about 1000 miles long, is all but useless.

It might be thought that the numerous falls that mark the rivers would provide many opportunities for the development of water-power. Actually development of this sort is of limited importance. The régime of the rivers militates against it, and the places where such schemes might be operated are usually far from important centres of population. At the same time, much attention has been

given in recent years to the development of hydro-electric power; and in addition to a number of relatively small schemes, particularly in West and Central Africa, some large ones are being developed. The river régime and the structure of the continent also hinder large irrigation schemes. The Nile basin provides the only examples of big irrigation development, there are important possibilities, however, along the Middle Niger, where some development has already taken place, and perhaps in the Kalahari region. Many minor irrigation schemes are found in North-west Africa and in South Africa.

LAKES

The lake-basins of Africa are broadly of two types. In the first group may be included those with low, flat shores, which are usually areas of internal drainage, such as the shotts of the Atlas region, Lake Chad, Lake Ngami, and the salt-pans and 'vleis' (which are pans with swampy floors) which are numerous in shallow hollows of the arid south, as well as larger areas of brackish swamp such as the Makarikari Salt-pans and the Etosha swamp. These vary in size from season to season and from year to year. Other areas of lake and swamp, drained, however, by rivers, include Lake Debo and other lakes lying west and south-west of Timbuktu, Lake No at the junction of the Bahr el Ghazal with the Nile, and various lakes—for example, Lake Leopold II—in the Middle Congo basin. An important lake of this group is Victoria Nyanza, occupying a broad depression in the Lake Plateau, and to the north is the lake and swamp area known as Lake Kioga, both of these are drained by the Nile. Lakes Bangweulu and Mweru, discharging to the Congo, are of the same type. The other great lakes of the continent belong to a second type, and differ from those of the first both in origin and character. They are confined to the Great Rift Valley system, and are often marked by great length and depth and by steep, cliff-like confining walls. Some—notably Lakes Rudolph and Stephanie—have no outlet to the sea. The water of the remaining lakes is (apart from some smaller ones of inland drainage) shared by the Nile, the Congo, and the Zambezi. The student should carefully study the somewhat complex drainage of the Rift Valley system. Water from Lake Tanganyika escapes by

the Lukuga only in very wet seasons, while the drainage of Lake Nyasa along the Shiré is also very variable. The variations in level of these lakes seem to be due primarily to differences in the annual rainfall, for these vast surfaces of water experience intense evaporation.

CLIMATE

A major influence upon the climate of Africa is the high altitude of the sun over the greater part of the continent. The vertical sun is experienced over some three-quarters of the area, and its effect is heightened by the aridity of much of the interior. Moreover, no part of the continent is sufficiently far from the equator to experience a very low altitude of the sun even in winter,¹ so that low temperatures, where they are felt, are largely the result of altitude rather than latitude, or occur only at night in dry regions where radiation is intense. The greater width of Northern Africa, its lower altitude, and its proximity to Asia all help to provide some climatic contrasts with Southern Africa (although there are also some striking similarities). The movement of air masses in relation to the varying position of the inter-tropical front, itself largely related to the migration of the overhead sun, is the major factor in connexion with humidity and the distribution of rainfall, while other influences that play their part in the climate of the continent are monsoon effects, ocean currents, and the nearness of the plateau rim to the coast.

The Influence of Ocean Currents. The currents of the seas surrounding Africa exercise considerable influence upon both temperature and rainfall. Flowing southward along the west coast of North Africa is the Canaries Current, a narrow strip of cool water, the relatively low temperature of which is further decreased by the north-east trade-winds, blowing the surface-water away from the coast and thus causing an upwelling of cool water from lower levels of the sea. An area below 70° F. in this part of Africa in July, as shown in the isothermal map, is a clear indication of the effect of this current upon the coastal temperatures, the effect being necessarily more marked in summer than in winter. Fogs

¹ The lowest noon altitude at the tropics is 47°, at Cape Blanco it is 30° and at Cape Agulhas 32°.

are common here as the result of the chilling of warmer air passing over the cool water, and the current also has the effect of reducing the precipitation along the coast by which it runs.

The counterpart of this cool current south of the equator is the Benguela Current flowing northward along the west coast of South Africa, where the significant name of Cape Frio is met with.

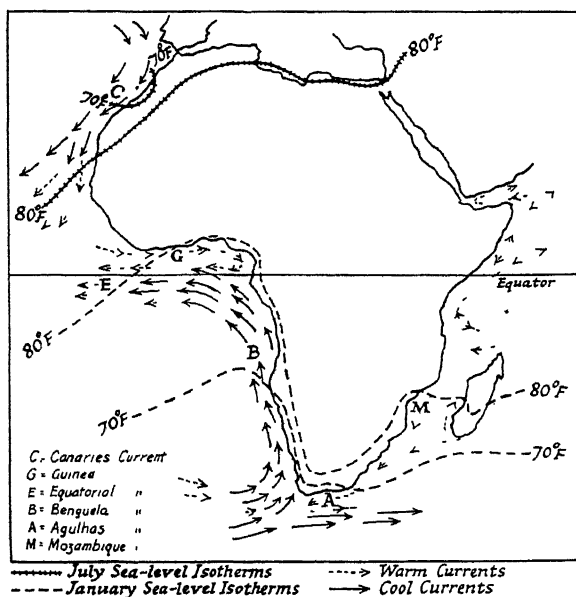


FIG. 11. OCEAN CURRENTS AFFECTING THE CLIMATE OF AFRICA

The effect of the cool currents upon the course of the isotherms shown should be noted. The reversal of currents in the Indian Ocean is due to the change of monsoons

Its effect is augmented by the upwelling of cold water due to the offshore south-east trades, and the coastal strip is foggy and arid. The cold influence is again more marked in summer, and the January isotherms of 70° F. and 80° F. bring out a striking contrast in temperature between the west and east coasts of South Africa. Nevertheless, the Benguela Current has a distinct effect upon temperatures at all seasons, for the surface temperature of its

water off the south of South-west Africa does not rise above 57° F —although, of course, the cooling is confined to a relatively narrow coastal strip.

Warm currents adjacent to a mainly tropical continent like Africa have their chief effects in reducing the annual range of temperature in the coastal districts by which they flow and in increasing the rainfall, for warm, moist air reaches the coast across them, and condensation tends therefore to be profuse. Flowing along the Guinea coast is the warm Guinea Current (over 80° F.), which promotes high temperature and heavy rainfall in the coastal regions of Upper Guinea. This current curves round in the Bight of Biafra and links up with the west-flowing water of the Equatorial Current, into which the cool water of the Benguela Current also merges. In the Indian Ocean the equatorial belt of surface-water is very warm, and is deflected by the east coast of the continent. The direction of the current, however, varies with the monsoon in the region north of Zanzibar, and it is noteworthy that the prevailing south-west wind of summer results in an upwelling of cool water along the coast south of Cape Guardafui. Passing south through Mozambique Channel is a current of warm water which clings to the coast of South Africa as far west as Cape Agulhas before it merges into the westerly drift of the 'Roaring Forties.' The west and east sides of the Cape Peninsula show a striking difference in the sea-temperature; the water is cool in Table Bay and warm in False Bay.

The Movement of Air Masses Over the oceans the converging air masses known as the north-east and south-east trade winds give rise to the doldrums belt, a zone of instability which is broadly the inter-tropical front or convergence zone of modern meteorology. This front over the Atlantic Ocean migrates within relatively narrow limits in sympathy with the overhead sun and continues over Africa, where the migration as between the extreme positions of January and July is much more pronounced. The detail of African climate, especially as regards winds and rainfall, needs to be fitted into the broad picture of moving air masses in relation to this front.

Two air streams of outstanding importance affect Africa. The first is the mass of continental tropical air—hot, dry, and often

dusty—blowing generally from the north-east and covering the Saharan region. The second is the south-east trade of the South Atlantic, which towards the equator is deflected to become the south-west monsoon of the Guinea region, towards the equator this consists of maritime tropical air, warm and moist. Two other streams also have considerable significance the north-east trade (the north-east monsoon of the northern winter) of the Eastern Horn region—continental tropical air at first, but becoming much more moist farther south—and the south-east trade (the south-east monsoon in the southern summer) of the Indian Ocean, broadly of the maritime tropical type

In July the inter-tropical front is situated about 20° N latitude, and three air streams dominate Africa. North of the front is dry tropical air characterized by clear skies and haze. Over the seas adjacent to the southern limb of the continent are the two streams of the south-east trades, each at this time relatively cool and dry and very stable, so that this great area (except for the extreme south) has its dry season. But as the trade wind mass of the South Atlantic moves north to cross the equator its character changes and it becomes a warm, humid, and unstable stream of monsoon air which is drawn over West Africa and the northern Congo region on its way to the inter-tropical front. It yields up its moisture mostly well before the front is reached and largely through the development of thunderstorms (From east to west through the monsoon travel from time to time small-diameter disturbances called 'tornadoes' that temporarily bring squally east winds and contribute to the rain and thunder of the monsoon period in West Africa.) The Eastern Horn, on the margin of this great movement, escapes serious precipitation.

In January the situation is rather more complex. The position of the inter-tropical front has remarkably changed. In West Africa it still lies north of the equator, following the east-west Guinea coast some distance inland (a fact possibly associated with the warm current that moves along the coast); it then bends south-east and east to cut the east coast in the neighbourhood of the Zambezi delta (about 20° S). The northern part of East Africa is affected by the north-east trade (or monsoon), relatively stable air but becoming less so as it progresses southward The

warm, moist south-east monsoon (or trade) brings rain of the convectional type to the coastlands of South-east Africa. These two air streams converge on the low-pressure region of the southern interior, and this type of rainfall spreads far inland. The south-east trade of the South Atlantic, at first relatively cool and dry, is drawn towards the Congo basin, developing moist and unstable characteristics as it approaches the inter-tropical front

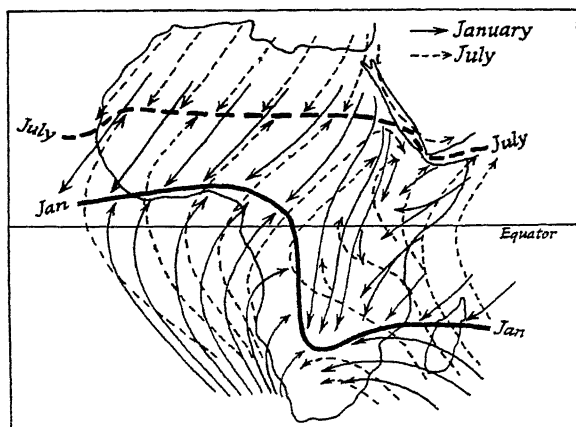


FIG 12 THE POSITION OF THE INTER-TROPICAL FRONT IN JANUARY AND JULY

Showing the major air streams affecting the continent

The part of this air stream that moves across the equator and reaches the Guinea coast from the south-west is weak, bringing only a limited amount of rain; the hot, dry, and hazy stream of continental air from the north-east—the harmattan—rises over this maritime air at the front, though in spells it reaches the coast at the surface

It is possible here to deal only with these major air movements. With the migration during the year of the inter-tropical front between its extreme positions comes a consequent shift of the main rain belt. This is clearly important in connexion with the seasonal rainfall and its detailed distribution, it may be noted that the so-called 'double maximum' of rainfall so often experienced

in the equatorial belt and very well marked on the East African plateau is clearly associated with the double passage of the inter-tropical front ¹

The main facts of temperature, pressure, and rainfall can best be studied from climatic maps and statistics, but it is desirable here to comment on the conditions prevailing in January and July, so that seasonal contrasts may be clearly brought out.

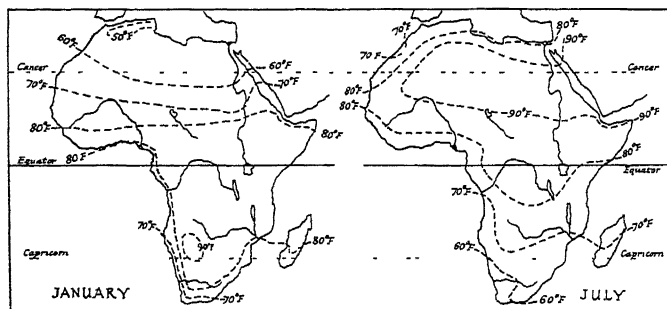


FIG. 13 JANUARY SEA-LEVEL
ISOTHERMS

FIG. 14 JULY SEA-LEVEL
ISOTHERMS

January Conditions. Sea-level temperatures vary from rather more than 50° F. along the northern coast of Africa to more than 90° F. in the central part of South Africa, where, despite considerable elevation, day temperatures are very high, although great radiation at night results in a large daily range of temperature in the more arid parts. The equatorial coasts of both West and East Africa are about 80° F., from which temperature they vary little throughout the year. Isotherms are approximately latitudinal over the northern part of the continent, but in the southern part they show a very different arrangement, which is due to the position of the vertical sun in relation to oceanic influences already referred to. Thus the January isotherm of 75° F. cuts the west coast about the equator and the east coast about 30° S. The pressure distribution is of the greatest importance in connexion with winds and

¹ This note on the movement of air masses is based on the relevant chapter in *The Restless Atmosphere*, by F K Hare, to which reference should be made for a more detailed account

rainfall. The Mediterranean Sea—whose water has retained a good deal of summer heat—is an area of relatively low pressure in comparison with Central Europe to the north and the Sahara to the south, so that it is an area in which depressions either originate or into which they pass from the Atlantic. The chief precipitation arising from these falls upon the coasts and mountain ranges of North-west Africa, the highest parts, especially of the Western

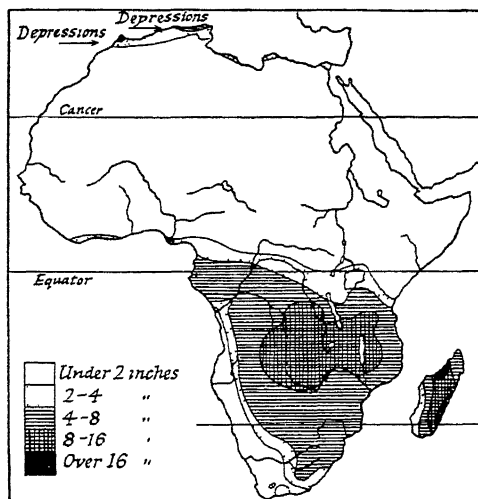


FIG 15. JANUARY RAINFALL

Atlas, receiving a good deal of snow. The islands off North-west Africa also receive their chief precipitation at this season. The eastern part of the north coast of Africa—lower both in latitude and altitude than the Atlas region—receives only a small rainfall, which is chiefly coastal, Alexandria's 7" of winter rain contrasting with Cairo's 1". Over the Sahara and the Sudan the pressure is relatively high, and a dry, north-easterly air stream prevails in this great area, which is rainless at this season. The coast-lands of West Africa, washed by the Guinea Current, are influenced to some extent by the now rather feeble south-west air stream, and

temperature conditions here are little different from those prevailing in summer. The rainfall, however, is small, and the dry harmattan wind from the Sahara reaches the coast intermittently, providing relief from the prevailing damp heat. There is a good deal of convectional rain along the equator except in East Africa, where the north-east monsoon or trade is blowing parallel to the coast.

Low-pressure conditions over the heated interior of South Africa give rise to a definite monsoon effect. The north-east monsoon or trades and the south-east trades, now monsoonal in character, of the Indian Ocean converge on the southern limb of the continent, bringing heavy rains to Eastern and Central Madagascar and to the eastern part of South Africa, with a lesser amount to the interior. The influence of relief is apparent, notably in Madagascar, while the amount of rain on the mainland opposite this island generally decreases towards the west and south. The heaviest rainfall of the mainland, however, falls at this season in a great area lying between the Zambezi and the equator, into which moves the very moist and unstable air from the east and a converging stream from the west less marked with these characteristics, but becoming more unstable as it approaches the inter-tropical front. The Namib region of South-west Africa is outside the influence of any such air stream, and this is true broadly also of the Cape region, which escapes in general the depressions of the 'Roaring Forties' that are found at this time farther south.

July Conditions The great width of Northern Africa and the absence of oceanic influence to the east of it results in excessively high temperatures over the interior of this part of the continent when the sun is vertical north of the equator. Summer temperatures here are distinctly higher than summer temperatures over Southern Africa. In July only the extreme south of the continent has an average temperature below 60° F. The Benguela and Canaries Currents are actively influencing temperatures along their respective coasts, especially the latter, and even the Red Sea, warm though its water is, effects a slight reduction of temperature as compared with the Sahara on the one hand and Arabia on the other. Both the Mediterranean coast and the equatorial and Guinea lands have a mean temperature of about 80° F, but

between these is an enormous area, covering a large part of the Sahara and the Sudan, with a mean sea-level temperature of over 90°F . Insolation through the clear skies of the Sahara brings about maximum shade temperatures of over 120°F .¹ and that the mean is only about 90°F . is due to the contributory effect of night radiation, which, of course, is greatly facilitated by cloudless skies.

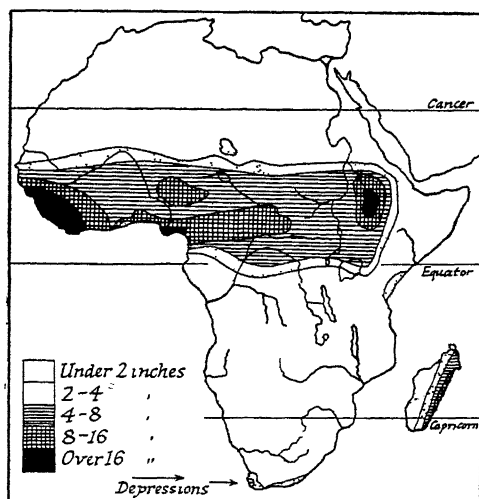


FIG 16. JULY RAINFALL

At this season the Mediterranean Sea is an area of relatively high pressure lying to the north of the belt of low pressure that now exists over the heated Sahara. Northerly and north-easterly winds prevail over North Africa nearly as far south as the southern limit of the desert, and precipitation is negligible. The Sahara belt of low pressure caused by the intense heating has its axis roughly along latitude 20°N ., that is to say roughly along this desert margin. The monsoonal conditions lead to the development of air streams originating in the far south; these are stable

¹ The world's highest recorded shade temperature, 136.4°F , was registered at Azizia in Tripolitania.

in the latitudes of the southern limb of the continent, which is in consequence enjoying its dry season. These air streams completely change their character as they approach the excessively hot zone north of the equator. Convection due to the great heat is primarily responsible for the heavy rainfall that results. The areas of specially heavy rain are the coastal regions from the Gambia to Ghana and the great bend in the Gulf of Guinea, especially the Cameroon mountains; the relief factor is clearly important. The Abyssinian Highlands, which lie athwart

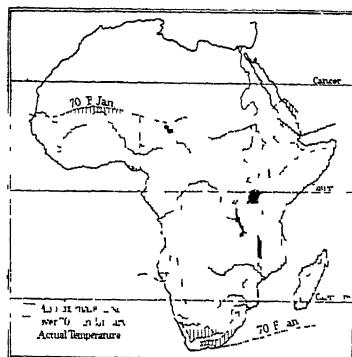


FIG. 17. APPROXIMATE AREA
OVER 70° F. IN JANUARY—
ACTUAL TEMPERATURE

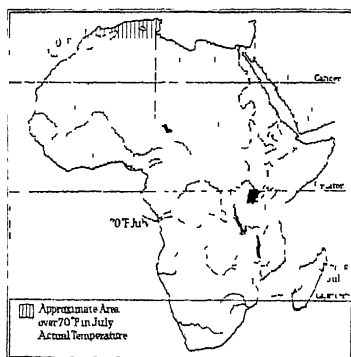


FIG. 18. APPROXIMATE AREA
OVER 70° F. IN JULY—
ACTUAL TEMPERATURE

the winds which approach the inter-tropical front from the south-west, are also very wet. The area of monsoonal rainfall includes, besides the regions already mentioned, the whole of the Sudanese zone, while rain of a convectional character falls in the northern part of the Congo basin and in Uganda. The Somali peninsula remains dry, however, for although south-westerly winds have displaced north-easterly ones, they here lack the characteristics that lead to substantial rainfall. Over the Sudanese zone rainfall declines northward as moisture has been released long before the inter-tropical front is reached, nevertheless, the monsoon may occasionally reach the Tibesti and other highlands of the Sahara

South of the equator there is a good deal of trade-wind rainfall, emphasized by relief, on the eastern side of Madagascar, but the east coast of the mainland is little affected by this. The relative weakness of the influence of the south-east trades at this season is attributable to high pressure over the South African plateau

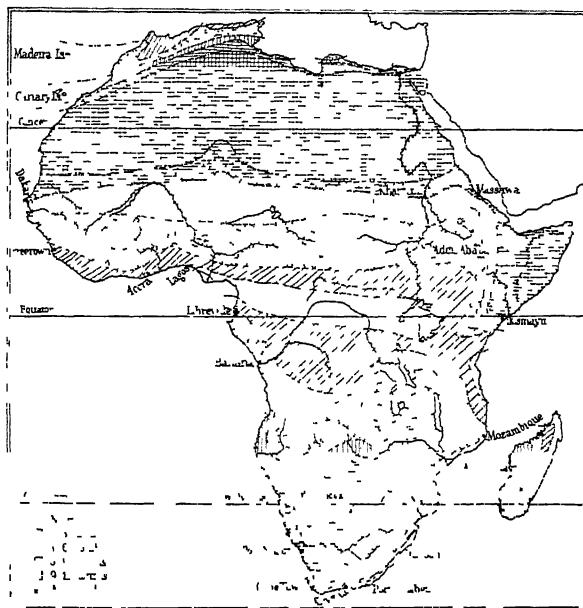


FIG 19 LENGTH OF THE DRY SEASON

This map, based upon statistics in Kendrew's *The Climates of the Continents*, shows the number of months with a mean of less than one inch of rain per month, which in these latitudes represents severe drought. Note the Knysna-Durban belt in the south, the east coast south of Zanzibar, and the east coast of Madagascar

Drought prevails over the greater part of the area. The extreme south-west and south, however, receive the benefit of the westerly winds and depressions of the Southern Ocean low-pressure belt, which have swung north in sympathy with the vertical sun, and here is the characteristic winter maximum rainfall of the Mediterranean type of climate.

CLIMATIC FIGURES FOR TYPICAL PLACES IN AFRICA¹

PLACE	LAT	ALT (feet)	—	J	F.	M.	A	My	Jn	Jy	Aug	S.	O.	N	D	ANNUAL RANGE (in ° F.)	ANNUAL RAINFALL (inches)
(1) Alexandria	32° N	105	° F In	56 2	57 0.9	60 0.4	64 0.1	69 —	74 —	77 —	79 —	77 —	73 0.2	67 1.3	60 2.3	23 —	7.2
(2) Cairo	30° N	67	° F In	54 0.2	56 0.2	61 0.2	68 0.1	75 0.1	80 —	81 —	80.5 —	77 —	72 0.1	65 0.1	57 0.2	27 —	1.2
(3) Algiers	37° N	194	° F In	53 4.6	54 3.6	57 2.9	60 1.6	65 1.6	71 0.6	75 0.1	77 0.2	74 1.7	65 2.6	60 5.0	55 5.1	24 —	29.6
(4) Biskra	35° N	410	° F In	51 0.9	55 0.4	60 1.0	67 0.3	75 0.9	84 0.2	89 0.1	88 0.4	82 1.2	70 0.9	59 1.0	52 1.0	38 —	8.3
(5) Khartum	16° N	1247	° F In	74 —	77 —	83 —	89 —	91.5 0.1	92 0.4	89 2.0	87 2.9	90 0.7	89.5 0.2	83 —	77 —	18 —	6.3
(6) Juba	4° N.	1509	° F In	84 0.2	85 0.6	84.5 1.3	84 4.8	81 5.9	80 5.3	78 4.8	78 5.2	80 4.2	81 3.7	82 1.4	83 0.7	7 —	38.1
(7) Lagos	7° N	10	° F In	81 1.1	83 2.1	83 3.7	82.5 5.7	82 10.5	79 18.7	78 10.7	78 2.8	79 5.3	80 7.8	81 2.6	81.5 0.8	5 —	71.8
(8) Kisumu	Eq	3769	° F In	75 1.6	76 3.2	75 6.8	75 6.0	73 7.7	72 4.3	71 2.4	73 4.1	73 2.4	75 1.9	75 4.3	75 3.2	5 —	47.9
(9) Leopoldville	4° S	1066	° F In	79 5.2	79 5.7	80 7.7	79.5 7.7	79 6.2	75 0.3	73 0.1	74 0.1	77 1.2	79 4.7	79 8.7	78 5.6	7 —	53.2
(10) Dar es Salaam	7° S.	47	° F In	81 2.8	82 3.2	81 5.6	80 11.8	78 7.4	76 1.1	75 1.1	74.5 1.1	75 1.4	76 2.3	79 2.7	81 3.1	7.5 —	43.6

(11) Tabora	5° S	4151	° F In	73 4 9	73 5 1	73 6 8	73 5 1	72 1 2	70 0 1	70 5	72	76 0 3	78 0 6	76 4 2	73 6 7	8	— 35 0
(12) Mozambique	15° S	49	° F In	81 8 8	81 9 1	81 5 8	79 3 0	76 1 1	73 0 7	72 0 4	73 0 5	75 0 4	78 0 2	81 5 0 9	82 3 9	10	— 34 8
(13) Salisbury	18° S	4831	° F In	69 7 7	69 6 9	68 4 7	65 1 1	61 0 4	57 0 1	57 5	59	66 0 2	71 1 1	70 4 0	69 7 1	14	— 33 4
(14) Durban	30° S	50	° F In	75 5 4 6	76 5 3	75 6 0	72 3 6	68 2 6	64 1 8	63	65	67 2 8	69 5 1	71 4 7	74 5 2	13	— 45 2
(15) Pretoria	26° S	4376	° F In	72 5 4	71 4 2	69 3 6	63 1 2	57 0 6	52 0 1	51	57	63 0 5	69 2 5	70 4 7	71 4 4	21	— 28 1
(16) Walvis Bay	22° S	24	° F In	66 —	67 —	66 0 1	65 0 1	63 —	61 —	58	57	57 5 —	59 0 1	62 —	65 —	10	— 0 3
(17) Port Elizabeth	34° S	176	° F In	70 1 2	71 1 3	68 1 9	66 1 9	62 2 4	59 1 7	58	59	60 2 1	63 2 3	65 2 1	69 1 7	13	— 22 9
(18) Cape Town	34° S	40	° F In	70 5 0 7	71 0 6	69 0 9	64 1 9	60 3 7	57 4 4	55	56	58 2 3	62 1 6	66 1 1	69 0 8	16	— 24 9

Notes (1) Fair annual range. Small winter rain—margin of Mediterranean rainfall (2) Large annual range—nearly 30° F. Desert conditions slightly modified by nearness to the Mediterranean (3) Characteristic figures for the Mediterranean type of climate (4) Desert conditions of Northern Sahara Note large annual range Small rainfall (5) Conditions of the Southern Sahara or northern fringe of the Sudan belt of summer rain Contrast annual range with that of (4) (6) Southern Sudan Small annual range, summer rain modifies summer heat Definite dry season (7) West African coastal conditions Relatively small rainfall in winter Note that Freetown has 151 in of rain and Cape Coast 351 in of rain (8) Temperatures modified by altitude, insignificant annual range Rain all the year, with two maxima (9) A few degrees south of the equator—the Congo basin Small annual range of temperature and short dry period Two rain maxima (10) Tropical coast of East Africa Least rainfall in winter Note the following annual fallings going northward—Mombasa, 47 in, Kisumu, 14 5 in, Berbera, 2 5 in (11) Tropical East African plateau Temperatures modified by altitude Definite drought in winter Two rainfall maxima still shown (12) Monsoon coast of East Africa opposite Madagascar (13) The Rhodesian savanna Contrast temperatures and rainfall with those of Khartoum, about the same distance north of the equator (14) Note small annual range and tendency to monsoon character of rainfall, although no very definite drought (15) The veld Moderate rainfall, chiefly summer (16) Desert coast of South-west Africa Low temperature for the latitude, due to Benguela Current (17) South-east coast of South Africa Sub-tropical temperatures Well distributed rainfall with rather less in summer than in winter (18) Mediterranean type of rainfall, although no month entirely without rain Compare temperatures with those of Algiers.

¹ Except for some figures for the Union of South Africa (taken from the *Year-book of the Union of South Africa*), the details in this table are based upon those given in Kendrew's *The Climates of the Continents*
Temperature figures are usually given to the nearest half degree and rainfall figures to the nearest tenth of an inch

Other Climatic Features The above general account may be supplemented by the following points

(1) Maximum heat is experienced in the dry areas about the Tropics of Cancer and Capricorn when the vertical sun in summer

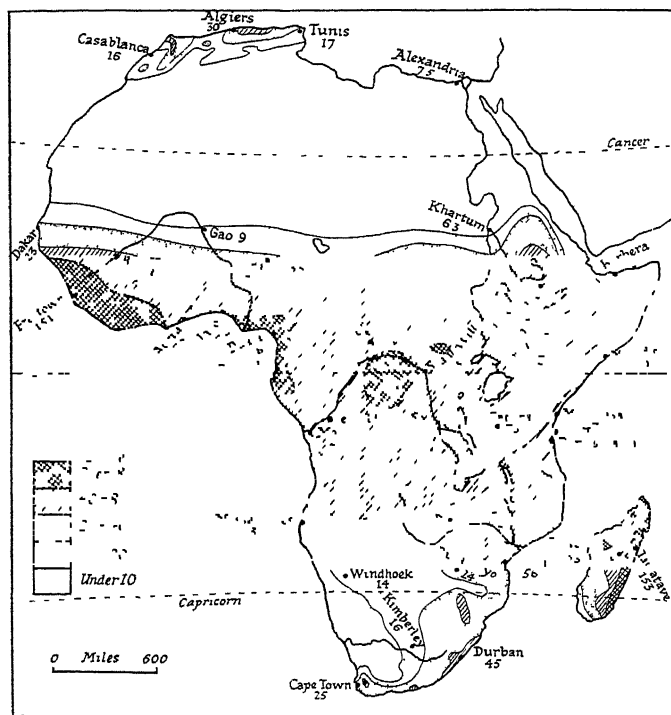


FIG 20 MEAN ANNUAL RAINFALL

The rainfall of a number of representative places is shown on the map

shines through an atmosphere of low relative humidity and the summer day is longer than twelve hours

(2) The high elevation of much of the continent leads to considerable modification of temperature (See Figs 17 and 18)

(3) Ranges of temperature—both daily and annual—are related to distance from the sea, to elevation, to the distribution of

rainfall, and to the *relative* humidity of the air. Annual ranges of temperature along the west coasts that lie near the equator are from 4° F. to 6° F., and even in interior districts of these latitudes are only a few degrees more. In the Sahara they reach well over 30° F.—nearly 40° F.

near the Atlas Mountains—and in the interior of Southern Africa over 25° F. The daily range, too, is excessive in the dry areas, and minimum temperatures in the Sahara go below freezing-point. All regions with a well-marked dry season have a considerable daily range of temperature. It should be remembered that, although humidity is a great controlling factor of both insolation and radiation, it is the *relative* humidity that counts, and although the Saharan air may actually contain more water-vapour than air over the British Isles—evidenced by frequent copious

dews—the humidity in relation to temperature is uniformly low.

(4) Over the greater part of Africa rain follows the vertical sun—that is, the maximum rainfall occurs in the summer months. If the two regions of Mediterranean climate and the purely arid areas be excluded, the rest of Africa experiences either a hot season with rain, and a cooler dry season, or, if there is rain at all seasons, then a maximum when the sun is overhead in the hemisphere in which the region is situated

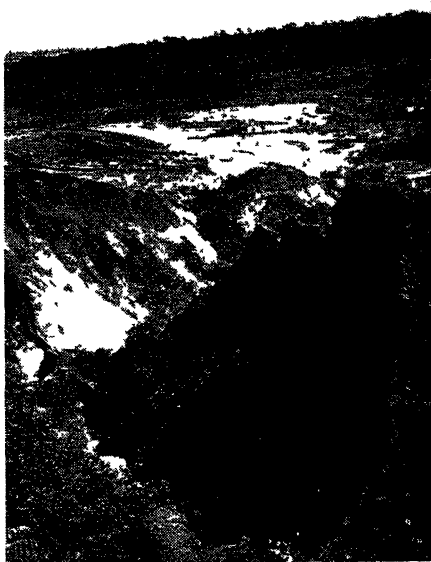


FIG 21. GULLY EROSION ON FARM LAND
IN EASTERN NIGERIA

This gully began on cleared land as a path down to
the river used by women when fetching water
Central Office of Information

(5) Many places within the tropics show a double maximum of monthly temperature, associated with the migration of the overhead sun. The actual months vary with latitude and local conditions, such as the onset of summer rains. At Timbuktu (17° N.) the months are May and September, at Luluaburg (6° S) they are April and December. Similarly, a double maximum of monthly rainfall may be experienced, particularly in the equatorial belt, associated with the passage of the inter-tropical front, and again the actual months vary. At Libreville, almost on the equator, they are March (with an April rainfall only slightly less) and November, at Nairobi (2° S.) they are April and November.

(6) Two characteristics of the rainfall are important—(a) its variability, especially well marked where it is seasonal in character, so that the mean figures mask very great differences from year to year, (b) its generally convectional character, so that the long-continued, relatively gentle rain of the British climate is uncommon. Convectional rain is, of course, an important factor in soil erosion.

(7) The aridity of the Sahara arises primarily from the fact that the pressure gradient slopes southward throughout the year, leading to winds chiefly from a northerly point. In consequence there is little penetration of oceanic influences. In the Kalahari Desert and South-west Africa lack of oceanic influence is again responsible. This region is off the track of moving air masses that might yield substantial rainfall, while moist air that may have crossed the Benguela Current is warmed, not cooled, in contact with the land, and yields little moisture. East winds are off-shore and dry. These arid lands belong to the so-called trade-wind deserts of the world.

VEGETATION

The distribution of forest, grass-land, and desert follows very closely the rainfall conditions. Broadly speaking, the wetter areas are forested, the arid areas are semi-desert or desert, and the areas of winter drought are grass-land.

Mediterranean woodlands of evergreen trees and shrubs are adapted to a hot, dry season and a mild, wet season. In North-west Africa the hilly belts are well covered with forests of ever-

green oak (including the cork-oak) and cedar, while evergreen shrubs with hard and usually small leaves are common, as growth is slow, but continuous almost through the year. There are large tracts of *maquis* covered with a growth of prickly drought-resisting shrubs. The olive is probably indigenous to this area,

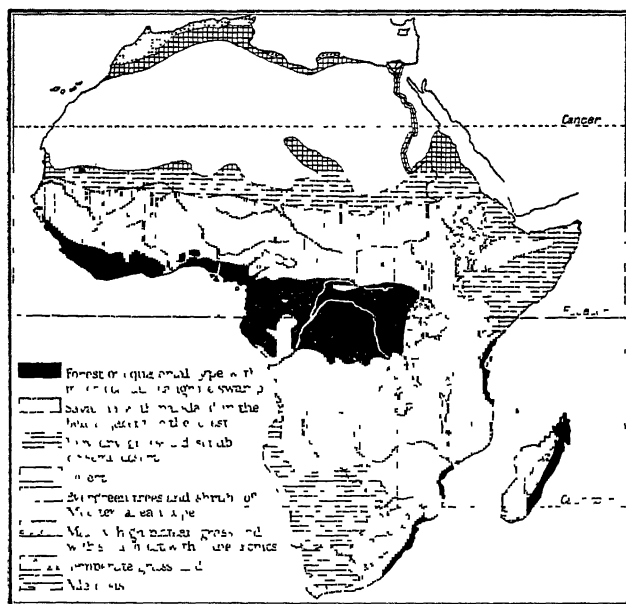


FIG. 22. NATURAL VEGETATION—GENERALIZED]

which is regionally continuous with Southern Europe. Typical cultivation includes wheat (a winter crop unless irrigation remedies summer drought), the vine, and, with irrigation, the orange. The vegetation of the south-west corner of Africa is similar, but conifers are rare. Fruit, so far as it is a large-scale cultivation, is a relatively modern introduction. The dry pastures are suited to sheep and goats, but the conditions do not favour dairy cattle.

Temperate forest is rather poorly represented in Africa for obvious reasons, but is met with on the lower slopes of the

Abyssinian Highlands (where, however, the deep valleys are more tropical in type), and elsewhere within the tropics on a few areas of highland of considerable elevation and rainfall

Equatorial rain forest, with a heavy canopy of foliage overshadowing below a gloomy vault characterized by lianas and epiphytes, exists in the regions where high temperatures are combined with plentiful precipitation and no definite period of drought. It extends in an irregular belt from the Gambia mouth through the Congo basin, and is almost broken in the middle of the Upper Guinea coast through insufficient rainfall. Its absence round the Lower Congo, due to decreasing rainfall and increasing altitude, is also noteworthy. This type of vegetation occurs again along the east coast of Madagascar and of tropical East Africa, where, although the rainfall is more definitely monsoonal, the general conditions of continuous heat and moisture are similar. *Mangrove swamps* characterize inter-tidal flats of the coastlands within the tropics

An outlying area with some features similar to those of this type of forest also occurs along the coast of Natal, where, although palms of a tropical character occur, the vegetation is by no means so luxuriant as farther north.

The forests of West and Central Africa contain some valuable timber-trees, such as mahogany, as well as the oil-palm and varieties of rubber. The oil-palm is not found east of the western branch of the Great Rift Valley. As a food the banana is widely cultivated, and tropical plants—*e.g.*, cocoa—have been introduced with success. The conditions do not favour cereal cultivation, except perhaps rice, but roots like cassava are widely grown. Pastoral occupations are necessarily poorly developed

The *African savannas*, or tropical grass-lands, cover a very large area surrounding the central forests, but the actual vegetation cover is by no means uniform over the vast area indicated on the map. Although insolation is considerable throughout the year, and the cooler season is generally dry, the elevation, the total rainfall, and the length of the dry season are varying factors. On the edge of the Sahara the semi-desert is a thorny scrub, which passes southward through a zone of relatively short grass—two to three feet high—not forming a continuous cover, and with

scattered trees, into better-grassed country and finally into a zone of taller grasses—five to eight feet high—with considerable tree-growth which is related in character to the forest growth farther south. This last zone has a good rainfall with a relatively short dry season, and seems partly to have come into existence through centuries of forest-clearing. Generally speaking, the prevailing vegetation cover is grass interspersed with trees which, except by streams and in moist hollows, are usually isolated. In the zone



FIG. 23. CATTLE ON FARM NEAR GWELO, SOUTHERN RHODESIA

*A herd of cattle in typical savanna country
High Commissioner for Southern Rhodesia*

of lower rainfall the huge baobab, or monkey-bread-tree, illustrates storage of water, while 'umbrella' trees show adaptation to drying winds. Dwarf acacias producing gum are a feature of the drier Sudan. The savanna extends with similar differences in character over the Lake Plateau across the Zambesi to the Drakensbergen, and dies out towards the Kalahari in the thorny scrub of the bushveld.

Millet and maize are the most typical grains of the savanna lands, but the cereals of the cooler temperate zone are grown as winter crops. Ground-nuts are a product of great importance, and cotton has long been cultivated. There are, of course, wide

differences in productivity over the enormous area of the savannas, which are nearly everywhere important for pastoral occupations.

The *temperate grass-land*, or *veld*, is steppe in character except in regard to its winter climate, which differentiates it from the temperate grass-lands of North America and Eurasia. Short grass

and low plants adapted to a brief growing season are characteristic, but there are considerable differences due to altitude. It is by no means everywhere adapted to cultivation, but maize, temperate cereals, and tobacco are grown. In more favoured districts, or with irrigation, fruit is produced, the hot summer favouring the vine and citrus fruits. Pastoral occupations largely characterize it.

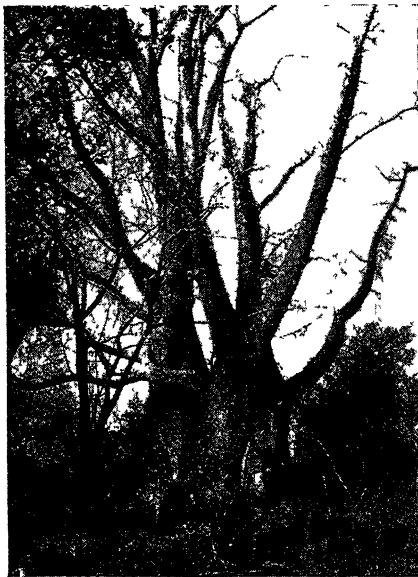


FIG 24. BAOBAB, SUDAN

A tree important in the economy of the African in the savanna zone. The trunk may be hollowed out for dwellings, the bark yields a strong fibre for ropes and cloth, the fruit is eaten.

Union Castle Line

High-plateau grass-land is a feature of a number of areas within the tropics, such as the Abyssinian and Adamawa Highlands and the plateau of Madagascar. Relatively temperate in character, the conditions favour pastoral occupations

Semi-desert and *desert* cover a very large part of the continent. In the semi-desert or scrub-land there is no continuous cover, and drought-resisting plants, either fleshy or prickly, are the usual type met with. North of the equator they are often aromatic. The south-west corner of Madagascar is of this scrub character, being deficient in rainfall, and within the Sahara the highland areas have a similar cover. The Plateau of the Shotts is another region of the

same type. The extent of true desert in South Africa is far smaller, of course, than north of the equator. There is both stony and sandy desert in the Sahara, and scattered growth occurs where underground water is not far below the surface. Oases permit of isolated settlements—often very large—where irrigation cultivation is carried on, the characteristic products being dates and wheat. The strip of intensive cultivation along the Nile may properly be regarded as an elongated oasis.

ANIMAL LIFE

This brief survey of the vegetation of Africa may be supplemented by a short description of the animal life. The tropical forests are enormously rich in insect and bird life, but large animals are chiefly confined to the rivers and swamps or to the borders of the forests. The occurrence of representatives of the higher apes is a feature of some interest. Animal life in the savanna is rich and varied. The more open conditions have promoted the development of swift-moving types, like the giraffe, zebra, antelope, and ostrich, preyed upon by large carnivores. Here and in the remaining areas (except the desert) domestic animals are important, although the tsetse fly seriously interferes with the rearing of cattle and horses in many parts within the tropics. In North-west Africa and South Africa there are many areas particularly well suited to the rearing of sheep and goats. The introduction of firearms and the opening-up of Africa have led to a rapid decrease in the numbers of the larger animals. In many parts stringent game-laws have been passed.

So important is the effect on the economic life of Africa of certain insects that they may be specially considered here. The mosquito and the tsetse fly have been called the most important animals of Africa. The anopheles mosquito acts as host to the germ of malaria, and in almost the whole of Africa protection against mosquito bites is necessary, and is often combined with regular dosing with anti-malarial drugs as a precaution. Mosquitoes breed in stagnant water, haunt dark places, are active at night, and are prevalent during the rainy season, usually summer. Malaria is not usually fatal when treated properly, but is debilitating and difficult to get rid of. It is noticeable that several Negro

ances of fine physique, like the Zulu, inhabit regions that are largely free from malaria. Mosquitoes are also carriers of other diseases, notably yellow fever, against which to-day there is effective inoculation.

The tsetse fly acts as host for the trypanosome of sleeping sickness, and the infected fly is found in many areas within tropical Africa, although seldom above 4000 feet. There is more than one form of the disease, and more than one species of the fly carries it.



FIG. 25. HERD OF ELEPHANT

Severe restrictions are now imposed in most African territories upon the killing of elephant, as of other big game. Note the park-land type of country.

Sudan Government

Sleeping sickness has been a great scourge, especially in Uganda, but preventive measures have limited it in recent years. The bite of the infected fly induces *nagana* in domestic animals and game, and it is noteworthy that when rinderpest decimated the animal life of South Africa in 1892 and subsequent years sleeping sickness disappeared from the areas which were then cleared of game.

Micro-organisms and ticks are responsible for many diseases of domestic animals, but where European influence is felt these are now being brought under control. Scab in sheep and goats can be prevented by dipping, rinderpest in cattle by inoculation. East-coast fever and gall-sickness, both terrible scourges to cattle, are avoided by the regular use of the dipping-tank. The dipping-tank is regarded as the salvation of the breeder of cattle, and its use is administratively encouraged, not only among European farmers but among Africans.

The locust, the ravages of which vary from season to season, troubles the whole of Africa outside the central forested areas, and the termite, or white ant, which attacks timber and young trees, is a pest in the tropical belt

The insect life of Africa undoubtedly provides a major problem in connexion with the development of the continent. The list of harmful insects is a considerable one, and even those of relatively minor importance, such as the chigoe flea (the 'jigger') and the 'maggot fly,' both of which deposit eggs under the skin, may be very troublesome, while the hookworm (an intestinal worm that develops from larvæ that attack the skin) is the cause of much chronic anæmia and debility. Nevertheless, the conquest of the mosquito and of the tsetse fly is fundamental, and much active work is being carried out in connexion with it. One of the chief difficulties is that there are different varieties of each requiring different methods of suppression, while it is unfortunate that the motor-car and the aeroplane are ready means of spreading the tsetse fly from an infected area to a free area.

An example of the control of malaria is provided by the copper-mines of Northern Rhodesia, where the native death-rate of 1931 was nearly halved the next year by measures taken against two dangerous species of anopheles mosquito. With regard to human trypanosomiasis, due to the tsetse fly, it is now curable by drugs if treated in the early stages, and progress has been made in the treatment of *nagana* by similar methods, the economic importance of this is considerable, as it is believed that the cattle population of Africa could easily be doubled if the danger of trypanosome infection could be removed. It is noteworthy that the ravages of the locust, which has often scourged much of the Sudan and East Africa, has led to international co-operation for the control of this pest.

CHAPTER II

POPULATION AND ECONOMIC REGIONS

THE native peoples of Africa vary in racial origin, and stand at many different cultural levels. Northern Africa has had an age-long relationship with the outside world, Arab influence along the east coast goes back to a period antecedent to those voyages of discovery that brought West and South Africa within the ambit of European interest. Gradually the penetration and exploitation of the continent by Europeans culminated in the partition of Africa in the last quarter of the nineteenth century. This has led to important social and political problems, for new ideas and economic forces have largely disrupted the native social structure, involved in which is the relationship between European and African in the future development of the continent.

PEOPLES

There was already in Africa an aboriginal population, represented to-day by the Bushmen of South-west Africa and spoken of as the 'bush' type, before the invasions by Negro or negroid peoples, several branches of whom probably entered the continent from Arabia and spread over the land south of the Sahara Desert. They probably also occupied the Sahara, for in the glacial period it was well watered and fertile. They provide the major ethnic element among African peoples referred to as 'black,' and appear to have begun their southward migrations in the continent about two thousand years ago. Northern Africa, however, was penetrated from Europe or Western Asia by Caucasian peoples broadly classed as Hamitic, and represented to-day particularly by the Berbers. Semitic peoples at a later date penetrated Africa. They were the Arabs, who established themselves in Northern and East Africa. The Phœnicians who founded Carthage were Semites. Hamitic and Semitic peoples constitute what is usually called the 'brown' element. Madagascar shows a

remarkable intrusion of people of Indonesian origin, who crossed the Indian Ocean, perhaps by way of island stepping-stones, at an unknown period and settled on the island, which may or may not have had an earlier Negro population; in the sixteenth century there was invasion and settlement by Malays. It may be noted that neither Greek nor Roman left any permanent ethnic mark upon Africa. The modern period has seen the settlement of large numbers of Europeans in certain parts of the continent, as well as smaller numbers of Indians.

There has, of course, been much admixture of Hamite with Semite (Abyssinians, ancient Egyptians, etc.), of each with Negro, and so forth. The brown type appears still to be relatively pure in the Nile valley; but brown and black are very mixed in the upper Nile and East African regions, and in Ethiopia there seems also to be a bush strain. Negro Africa proper lies south of the Sahara, and it is usual to divide the Negroes into two main types, the Sudan Negroes and the Bantu Negroes, the line of division being irregularly drawn from a point at the head of the Gulf of Guinea, round the north of the Congo basin, to the middle of Lake Victoria. The Sudan Negroes speak a variety of languages, though showing relative uniformity of physical characteristics. The Bantu Negroes, on the other hand, vary much in physical character (suggestive of much admixture), but speak allied languages, which are classified as Bantu. From the Bantu Negroes must be distinguished the Hottentots and Bushmen of the southwest of the continent. The Bushmen are very small yellowish-brown people, and formerly had a much greater extension, as their rock-drawings have been extensively found in Rhodesia and even farther north. The Hottentots seem to occupy an intermediate position between Bushman and Negro. It seems clear that migration and inter-breeding have led to such widespread mixture of the three major racial elements that it is probably true to say that, apart from modern immigrants, there are to-day no pure races in Africa.

Varied cultural levels are found among African peoples. The Bushmen and the few pygmies of the interior of the Congo basin (probably a branch of the black race) are at the hunting stage of development. The Negroes are, broadly speaking, agricultural,

though in the grass-lands agricultural and pastoral occupations are combined. The Berbers of the north are mainly agriculturalists, but the Tuareg are nomadic. The Arabs are both settled and nomadic. But, except where Europeans have influenced Africa, the standard of agriculture is low. Flocks and herds are poor in quality and scourged by disease. Even in the north, where Carthage and Rome achieved remarkable productivity, agriculture is of



FIG 26. IN ZANZIBAR TOWN

Zanzibar is the most important Arab trading settlement in East Africa
Union Castle Line

a low standard. The Negroes are often wasteful cultivators, abandoning land as soon as it has ceased to be productive, and little more than scratching the surface in place of ploughing, for the typical agricultural implement is the hoeing-stick.

African peoples have hitherto shown little genius for political organization. Petty tribal divisions have been the rule, though it is difficult to tell what might have happened to the expanding Fula empire in the Western Sudan and to the Zulu empire in South Africa if European intrusion had not prevented their development. Large centres of population are generally absent, except where the

Arab trading city or oasis town grew up. Indeed, until the modern period Africa had no towns in the proper sense of the word except where Arab influence had been at work—in the north near the Mediterranean, in the Northern Sudan, and in East Africa, where Arabs had established such trading centres as Mombasa and Zanzibar. Similarly, large-scale industry as understood in Europe is unknown to the African, except where it has been introduced and organized by the white man, although many tribes exhibit considerable craft skill in metal, wood, and weaving.

Christianity once prevailed over Mediterranean Africa and much of the Nile valley, but, except in a debased form in Ethiopia, has been almost completely displaced by Mohammedanism, which is making rapid strides in the Sudan and part of East Africa. Elsewhere Negro Africa is pagan except where Christian missions have influenced the people. Christian missionaries have, in fact, contributed much to the sum of knowledge of the geography of Africa, besides having led the way in the abolition of the slave-trade. In some instances they have been largely responsible for European intervention, notably in connexion with the protectorates of Uganda and Nyasaland.

EUROPEAN INFLUENCE

At the beginning of the Age of Discovery Northern Africa, including the Northern Sudan, and, through Arab traders, East Africa, had some contact with the outside world. The rest of the continent was self-sufficing, disunited, and at varying levels of primitive development. It could offer the European little that he valued, and its geographical conditions for the most part did not invite colonization. Portugal, the first European Power to establish itself in the newly discovered Africa, aimed at keeping the trade of the continent, mainly ivory and gold, in its own hands. The Arabs seriously interfered with Portuguese settlement in East Africa, but Angola was colonized at the beginning of the seventeenth century. The Portuguese did not establish themselves in South Africa, letting the Dutch in on the decline of their ascendancy. The Dutch made Table Bay their base in Africa. Dutch, British, French, and other Europeans all competed for a share in the trade of tropical Africa when Portuguese power declined. The

nature of the trade is well illustrated by the names that still appear on the map of the West African coast—Grain Coast,¹ Ivory Coast, Gold Coast, and Slave Coast. The settlements were coastal, and knowledge of the interior was extraordinarily vague. The slave-trade was for long most lucrative, and held the interest of many Europeans in Africa. Europeans carried it on in West Africa and Arabs in East and Central Africa. The plantations round the Gulf



FIG. 27. MUSONOI COPPER-MINE—KATANGA

Documentation C I D Bruxelles

of Mexico and the Caribbean Sea, including the West Indies, were developed by slaves from West Africa, and the Portuguese decimated Angola for the development of Brazil.²

While South Africa was developing on its own lines, the interior of tropical Africa was neglected, a state of affairs which persisted far into the nineteenth century. Then the interested European Powers awoke to the value of tropical lands as sources of raw materials in growing demand in the modern world and also, if the demand could be created, as new markets for manufactured goods. The "scramble for Africa" began. Coastal trading-stations developed into spheres of influence which often

¹ The 'grain' referred to was a spice grain—a seed which entered into commerce under the name of Malaqueta pepper

² The oversea trade in slaves ceased nominally early in the nineteenth century, but actually persisted for some years afterwards

became demarcated by straight lines in the absence of accurate topographical knowledge of the interior. Britain, France, and Belgium secured large areas. Germany and Italy were late-comers in the field of expansion in Africa. British interest partly resulted from activity in suppressing the slave-trade, while French interest in the Atlas region dates from France's rout of the Barbary corsairs in 1830. The German colonies were, after the



FIG. 28. COPPER-CONCENTRATION WORKS AT JADOTVILLE, KATANGA
 Industrialization in Central Africa
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First World War, allocated as mandates mainly to France and Britain, carrying the obligation to promote the material and cultural welfare of the indigenous peoples. Following the Second World War, these mostly became trusteeships held under the authority of the United Nations, and now have or are about to have self-government.

How far Africa provides a field for European settlement it is still difficult to say. Temperate South Africa, including the higher

plateau areas, has certainly been effectively settled. Southern Europeans are established in North-west Africa. Elsewhere the highland regions offer the only possibility of permanent settlement. The great heat and strong insolation of tropical Africa are limiting factors, and where these are combined with high humidity there is a great debilitating effect upon the white man, as the skin cannot function properly. The prevalence of disease, too, cannot be overlooked, although this difficulty can, in a measure, be brought under control. On the highlands of Kenya, Tanganyika, and elsewhere white settlement seems to have passed the experimental stage. Broadly speaking, Europeans over large areas of tropical Africa must be only temporary inhabitants, whose work will be mainly of an official, supervisory, or commercial character. It is estimated that half the Europeans in the continent as a whole live in the ports and coastal zone.

Settlement from India has taken place to a small but significant extent in parts of Eastern Africa, and, but for political difficulties, might substantially increase.

DENSITY OF POPULATION

Africa's population (1960) is about 240 millions, nearly 21 to the square mile. The distribution reflects to a great extent the physical conditions. In particular, apart from the special case of the Nile valley, the density of population varies very largely with the rainfall. The Lower Nile valley is a region of increment where human intelligence has been applied in an arid region of high temperature watered by a river of extraordinary régime, with the result that it supports a very dense population, strictly limited in area by the availability of the water. The Sahara Desert, apart from its oases and little-known highlands in the heart, provides no support for human life, and the influence of the water-supply is naturally well marked. The desert, moreover, is a broad barrier to communication, and separates the relatively well-populated area of North-west Africa from the region of considerable density found in the tropical rain-belt. In North-west Africa coastal regions and valleys support the bulk of the population, and the greater proportion of very high land in Morocco is reflected in a thinner

population, while, on the other hand, the plains of Tunisia are particularly well peopled.

Over large areas of the Sudan and the savanna lands generally pastoral pursuits largely predominate, and the density of popula-

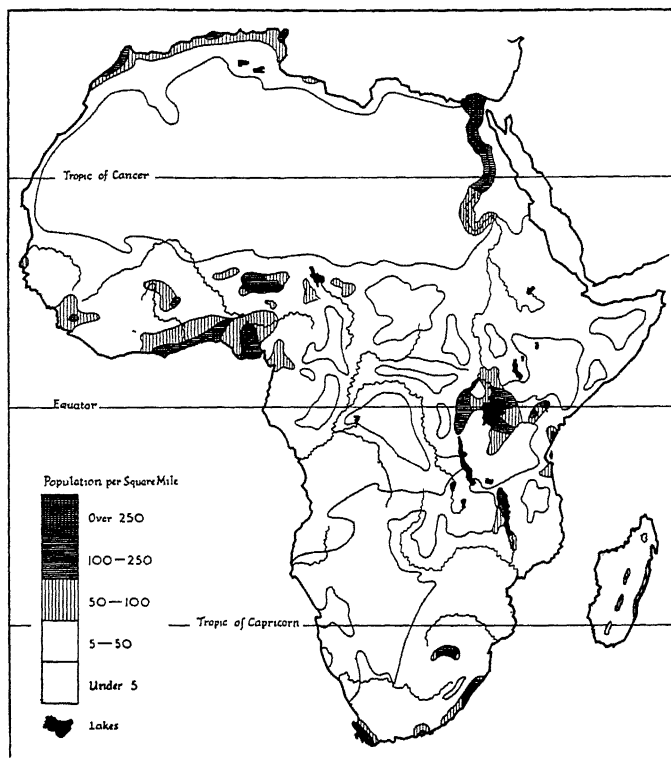


FIG 29 DENSITY OF POPULATION

Such a map as this can at best be only a rough approximation, it is useful, however, in bringing out the more important contrasts. Along the Lower Nile the density considerably exceeds 1000 per square mile

tion does not there reach that found where agriculture has more importance, as, for example, in the Niger basin and the region draining to Lake Chad. Deficient rainfall, as in the Eastern Horn,

and extreme elevation, as in parts of Ethiopia and the mountains fringing the Lake Plateau, militate against population, but the Lake Plateau itself and parts of the Rift Valley are well peopled. There rainfall and soil are favourable to agriculture and cattle-rearing. In Madagascar, again, the plateau has a denser population than much of the lowland. Owing to the ease with which the simple necessities of life are obtained in tropical regions of heavy rainfall the population is relatively dense in certain such parts of Africa, and the influence of rivers as a means of communication and a source of food is well illustrated in the Congo basin, in West Africa, and by the Lower Zambezi. In South Africa large arid tracts are only thinly peopled, the comparatively dense population being chiefly found in the regions of good rainfall or mining activity. The grass-land belt, being best suited to pastoral pursuits, supports only a light population.

The distribution of population in the continent will be found to have a distinct relationship with that of the major economic regions. The African population to-day is rapidly increasing as a result of the European control, which has promoted health services, stopped tribal wars, and almost completely stamped out the slave-trade, the methods of which were extraordinarily destructive of human life as well as of property. The slave-trade was largely connected with Arab and later with Portuguese penetration, but it may be remembered on the credit side of Arab influence that they introduced rice and sugar-cane and possibly other useful plants, while the Portuguese brought manioc, sweet potato, and maize.

The spread of Mohammedanism in many parts of Negro Africa, another outcome which continues to-day of slave-trading, represents a great advance on the earlier beliefs and superstitions.

MODERN DEVELOPMENT¹

European influence has gradually brought the whole of Africa within the ambit of world-trade, but from the point of view of the division of the continent into economic regions there are two

¹ *An African Survey* (revised in 1956), edited by Lord Hailey, is a valuable reference book in connexion with many of the topics briefly discussed in this chapter.

modern developments—not unrelated the one to the other—which are specially important.

While to-day most political divisions in Africa have secured independence and some others are approaching independent status, there is no territory in the continent that has not in the modern period been under the direct influence or control of some outside power, and at the present time some European power is responsible for the administration of each of the remaining political divisions. This control or influence has been in the past, and often



FIG. 30. DONKEY CARRYING LOAD OF HAY

The donkey is an important beast of burden in Mediterranean Africa and in the Sudanese zone
Sudan Government

still is, directed to the development of the territory concerned as an economic asset to the responsible country. Tariffs and internal organization in such forms as mining development, research, agricultural education, and public health have been directed towards this end, and the territory has tended to be delimited as an economic unit from adjacent regions under other control

Arising from this political interest, but sufficiently important to need special emphasis, is the local improvement in communications without which such development is impossible. The more primitive means of communication that so long prevailed in Africa, including sailing-craft on the Nile, canoes and human portage in Central Africa, camels in the desert, mules in the Atlas region, and

the more recent ox-wagon of the south, could not suffice for modern needs, for the problem of opening up Africa was largely the problem of overcoming the natural obstacles in the way of easy transport. This improvement in communications has taken the form of the making of roads, largely for motor-transport (though often with a surface unusable in the wet season), the provision of steamers on great rivers and lakes, and, above all, the construction of railways. Africa has now the skeleton of a railway-system, consisting largely of unrelated local lines, the immediate object



FIG. 31 NET-FISHING IN A NYASALAND RIVER

Fish adds a valuable protein content to the diet of many Africans, and the catch is secured by a variety of methods in river and lake. The canoe is an important means of African transport in the inter-tropical section of the continent.

of which is either to connect a portion of the interior with the coast or to bring a section of navigable water into the general scheme of communication. The expense of railway-construction in relation to the volume of trade hinders extension, yet a single line may have difficulty in coping with a seasonal rush of trade. Sectional political interests tend to lead to independent railway development, thus assisting the demarcation of one region from another. The best-developed networks of railways are found in the Union of South Africa and in the Atlas region. Generally speaking, railway improvements and extensions have mainly local importance. Valuable as air transport is to-day, it cannot take the place of railways in coping with the transport requirements of Africa.

It may therefore be said that climatic conditions (especially as influencing the vegetation and the density and character of the population), together with the political status of an area often controlled at some time by a European Power (giving a particular character to administration and determining development, the lay-out of communications, and channels of intercourse with the outside world), are the most important considerations in demarcating economic regions in Africa. Historical considerations often reinforce the economic factors.

ECONOMIC REGIONS

With the foregoing in mind it is possible to outline briefly the reasons for demarcating the major economic regions of the continent (shown in Fig. 32).

(1) *North-west Africa and the Sahara.* The outlook and trade of the coast-lands have always been Mediterranean, and active French development in the Atlas region, and, to a lesser extent, former Italian control of the Libyan area, have largely confirmed this in modern times. Climatically it is possible to subdivide this large area. The relatively well-watered coastal districts of the north-west are different from the Plateau of the Shotts and again from the desert. But, in avoiding subdivision, the justification for demarcating this region lies in its economic relationships. Certainly since Carthaginian times such trade as the Saharan oases carried on was mainly through Mediterranean ports, and in modern times French railways have already penetrated the desert in the north, from which direction French economic effort was most easily and mainly directed. The same is true of that part which was under Italian control. The southern boundary is marked by the increase in the density of population reached in the savanna lands to the south; on the east a convenient political boundary is taken.

(2) *Egypt and Sudan.* Here, apart from a certain unity given by the Nile, and in spite of the gradual change in climatic conditions going southward, there is one dominating crop—cotton, and primarily irrigation cotton, for which, as for food, the Nile waters are essential. It is true that two political divisions are

involved, and that there is a break in the railway following the Nile valley; yet the Nile is to some extent a commercial link, and the exports of Sudan from Port Sudan on the Red Sea reach their market mainly by way of the Suez Canal, which is within Egyptian territory.

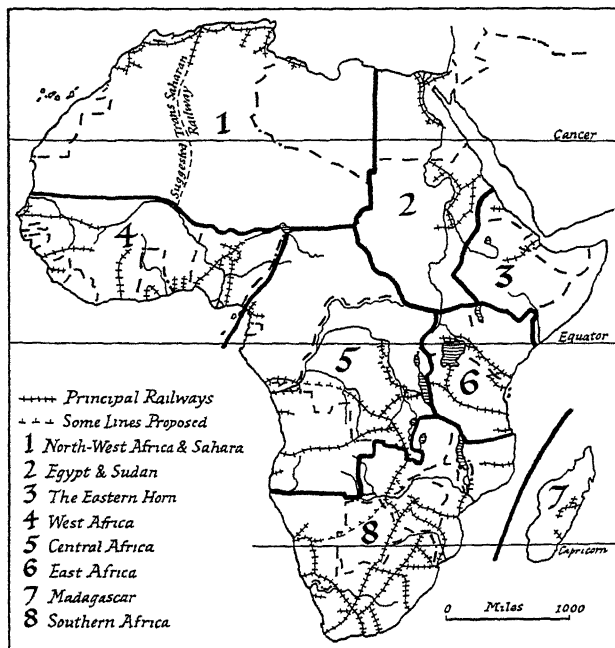


FIG 32. MAJOR ECONOMIC REGIONS

(3) *The Eastern Horn* From the point of view of external trade the whole of this area is of small economic importance. It contains a variety of regions, both as regards relief and climate. Ethiopia, with its monsoon rainfall, is relatively densely populated; the rest is arid and chiefly pastoral. Communications are ill-developed, and mainly trend eastward. There is a single narrow-gauge railway from Jibuti to Addis Ababa, which carries only a little traffic, and another short line running inland from Massawa.

Political boundaries have been used to demarcate the region, which includes the independent countries of Ethiopia and Somalia and a small area administered by France.

(4) *West Africa*. This area is clearly demarcated in the north by the Sahara, on the west and south by the sea; on the east a political boundary conveniently marks it off from a relatively undeveloped region. Included in it are both savanna and forest lands. Though partly drained by lesser rivers, its dominant feature



FIG 33 THE SENNAR DAM, SHOWING THE MAIN CANAL
Central Office of Information

is the basin of the Niger. French and British interests have pursued a policy of active development, which throughout the region is dependent upon access to the Atlantic. West Africa provides an example of successful European administration of African peoples, who include some relatively advanced Negroes in both forest and savanna zones. The strips of former French territory reaching the coast from the Sudan are noteworthy, and help to account for the peculiar railway development (Fig 97). The French utilized the Niger and the railway from Bamako to Dakar to link the interior savanna districts with the west coast. The population,

especially between Lake Chad and the Gold Coast, is very dense for Africa, and the total trade, though still hardly commensurate with the population, has expanded with improved communications and the progress of the people in agriculture. The interlocking of the political divisions, which include Liberia, Ghana, Nigeria, and Guinea, and some Portuguese territory, hinders the development of a unified system of railways in this region

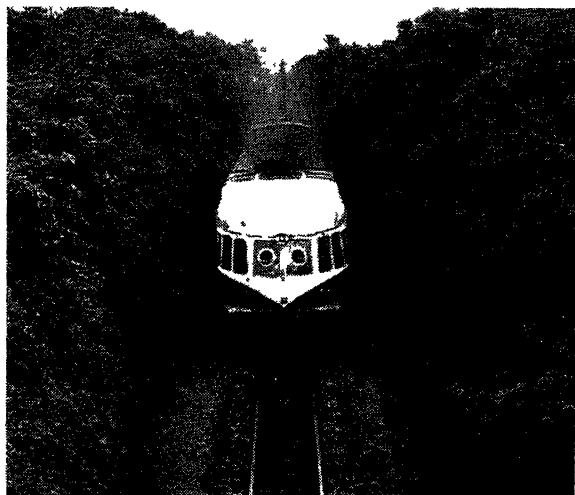


FIG. 34. SCENE ON THE RAILWAY INLAND
FROM ABIDJAN, IVORY COAST

Service d'Information de la Côte d'Ivoire

(5) *Central Africa.* Largely as a result of its physical conditions, this region, comprising mainly independent countries formerly under French and Belgian control, is at a lower stage of economic development than that last considered, and has a lower density of population. Its outstanding feature is the Congo basin, with equatorial rain forest in the central area, surrounded by savanna. The extreme south of this division shows a tendency to aridity. Especially in the Cameroons, where considerable altitude is combined with heavy rainfall, and in the jungles of the Congo basin

itself, development is necessarily difficult, though considerable strides have been made in the latter area. Attention has been given to the more open lands forming the eastern and southern rim of the basin, where savanna occupations can be encouraged and mineral wealth exploited. Much depends upon the improvement of communications. The Congo, with its falls avoided by railways, is still an unsatisfactory line of movement. The northern interior of the region is still difficult of access, but in the southern



FIG. 35. KILINDINI HARBOUR FROM THE MAINLAND

The improvement of harbours and the provision of railways have been essential to the modern development of Africa. Note the single-line track common to most African railways

Information Office of H M Eastern African Dependencies

part considerable importance attaches to the line from Lobito Bay running to the Katanga district, which is also linked up with the South African railway-system. On the east the western branch of the Rift Valley system helps to form the boundary of this economic area, the communications of which lead out mainly to the Atlantic

(6) *East Africa*. This region, covering the greater part of the Lake Plateau and the area east of it, also contains a considerable variety of relief and climate. In addition to the savanna plateau, there are the plateau slopes, a large section of Rift Valley, and a relatively broad coastal plain. This last, with a considerable rainfall of the monsoon type and deltaic rivers, is densely forested. Kenya merges into aridity on the north, where a political division

is taken as the boundary. The region is under British supervision, and European settlement is important in Kenya and Tanganyika Territory. Old-established Arab interests remain, centring in Zanzibar, and administrative and social problems have arisen through white settlers having occupied the higher and therefore more temperate districts and through the immigration of Indians. There is a variety of products, including introductions such as



FIG 36 TARRING THE BLANTYRE-ZOMBA ROAD, NYASALAND

At a cost of over £10,000 per mile, only limited road development of this kind can be undertaken

coffee and sisal hemp. Communications trend eastward, Uganda, although within the Nile drainage system, carries on almost all its trade through Kenya, and so is included in the region.

(7) *Madagascar*. This large island, in the French Community, is an obvious unit, with diversities of relief and climate. Communications and external trade are poorly developed at present. Certain outlying islands, such as Mauritius and Réunion, are, for their size, of much greater economic importance.

(8) *Southern Africa*. Apart from Portuguese East Africa, this large region is part of the British Commonwealth, and includes the Union of South Africa and the Federation of Rhodesia and

West African and South African products come very largely to Britain, which sends in return a variety of manufactured goods. Former French lands trade mainly with France. The numerous political divisions and the peculiar development of railway communications have led to many ports, scattered along the coast, often concentrating the bulk of the trade of a considerable area. Such, for example, are Casablanca, Dakar, Abidjan, Lagos, Durban, Mombasa, Port Sudan, and Alexandria.

Africa has two great nodal points in connexion with world-shipping—Port Said and Cape Town. Port Said commands the short route between Western Europe and the Indian Ocean, Cape Town the longer route, and these two are, from the point of view of the shipping visiting them, the busiest ports of the continent, although the volume of trade is in neither case commensurate with the tonnage.

North-west Africa is specially important, as there passes by it both the traffic going by the Cape route and that between Western Europe and South America; notable ports of call include the Canary Islands, the Cape Verde Islands, and Dakar. A call is often made at Freetown, at the entrance of the Gulf of Guinea from the North Atlantic. Places serving the Indian Ocean include Durban, where coal and locally processed oil are available, and Mauritius, often visited on the way to and from India.

Submarine cables link the principal ports, important points for such communication with Europe being Alexandria and Cape Town. St Helena is a junction for cables to South America and Cape Town, the Canary and Cape Verde Islands being other junctions in the Atlantic. On the east Zanzibar and Durban are noteworthy, these being linked with Mauritius for connexion with the Far East.

Wireless stations are now numerous, though their power varies considerably. This form of intercourse is valuable for communicating with isolated administrative posts.

AIR ROUTES

Air services are of great importance to this continent of long distances and physical obstacles to surface movement. So far as

oversea connexions are concerned, it is clear that three European countries—Britain, France, and Belgium—have mainly been interested. Britain's 'main line' is to Johannesburg *via* Rome, Cairo, Khartum, and Nairobi, this route being covered in approximately a day. Another important British route is to Lagos or Accra, *via* Kano. French services particularly concern (a) Tunisia, Algeria, Morocco, and the routes to Dakar (for Brazil), Bamako,

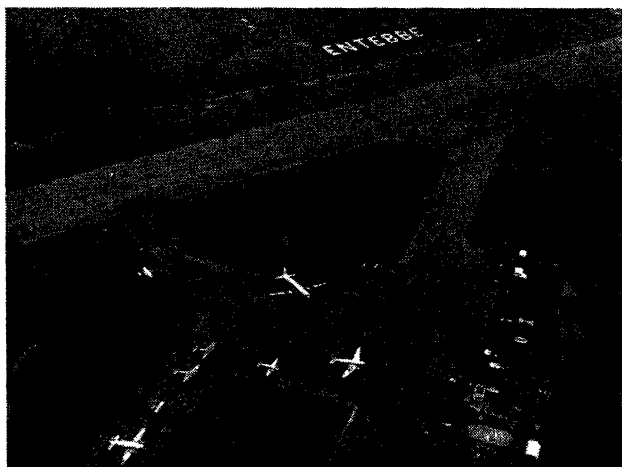


FIG. 37. ENTEBBE AIRPORT
Central Office of Information

Conakry, Abidjan and Lome; (b) the route to Fort Lamy and Brazzaville, thence to Madagascar and Réunion. Belgium's principal connexion has been with Leopoldville.

There are, of course, many 'feeder' lines reaching different points on these main routes, and the detailed map to-day of regular routes is a very complex one. Cairo is the most important air junction of Africa, largely because of its connexions with eastern countries. Johannesburg, Khartum, and Dakar are leading foci, and others of note include Tripoli, Kano, Nairobi, Bangui, Cape Town, and Leopoldville. From the last-mentioned radiate routes to many centres in the Congo basin, where

Elizabethville is another significant junction. In addition to major and minor airports serving the larger centres, there are now numerous landing-grounds or air strips either to serve lesser centres or for emergency purposes. As with railways, the growth

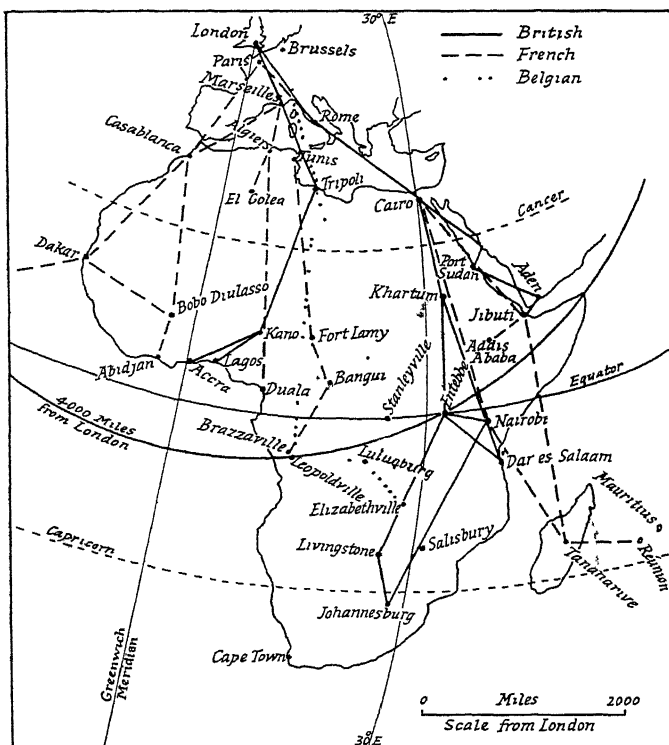


FIG. 38. MAJOR AIR-LINKS BETWEEN EUROPE AND AFRICA, 1959

This is an equidistant map centred on London

of important administrative and mining centres has encouraged the development of air services, while air transport cannot economically serve the movement of bulky goods, it greatly facilitates administrative and commercial activities.

CHAPTER III

NORTH-WEST AFRICA AND THE SAHARA

GENERAL CONSIDERATIONS

MOST of this area, which covers about 3,000,000 square miles, is of little economic value, only one-tenth—in the Atlas region—being important from that point of view. Nevertheless, the Sahara, which forms a barrier between North and Central Africa, has its historic links with the Mediterranean Sea, and since the political control has operated mainly southward from the territories influenced by France and from the Libyan coast it may be conveniently included with the lands to its north. It is bounded on the south by the Sudanese zone, the present-day interests of which lie chiefly southward and westward. On the east the desert continues into the Nile lands, where the boundary with Egypt and Sudan is used to define the region. In the west Spain holds a coastal strip of the Sahara, but the greater part of the arid region is within the French Community.

Physical Features. The chief physical features are the Atlas belt of young folded mountains falling to a plateau which is separated from the main plateau of the Central Sahara by a belt of depressions running from Mauritania¹ to the Gulf of Gabes, and continuing along the Libyan coast, except where the Barka plateau projects into the Mediterranean Sea.

The Atlas Mountains constitute a unique structural feature in Africa. Ridged up in late Secondary and early Tertiary times, they are thought by many to be physically continuous with the Alpine mountain folds of Europe, and at one time connected in the west across the Strait of Gibraltar and in the east, *via* Sicily, with the Apennines. The core of the Atlas system is in the High (Great or Snowy) Atlas of Morocco, with a central mass of Archæan rocks, reaching a height of 14,000 feet in the peak of Tubkal, while Likumt

¹ This was the old Roman name for Morocco, but it is now applied to the region north of the Senegal river.

is nearly as high. Lying to the south, and separated from the High Atlas by the Wadi Sus, is the Anti-Atlas, of somewhat lower elevation, while eastward run two roughly parallel ranges, rarely reaching 6000 feet, the Tell Atlas and the Saharan Atlas, which respectively terminate at Bizerta and Cape Bon. Branching from the Tell Atlas are the Rif Mountains, which curve round to the Strait of Gibraltar and were possibly formerly connected with the Sierra Nevada. A very important feature is found in a broken

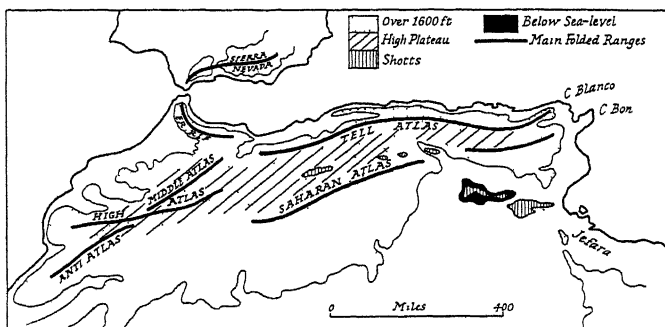


FIG. 39. GENERALIZED PHYSICAL FEATURES OF THE ATLAS REGION

third range, the Sahel of Algeria, running between the Tell Atlas and the sea, and well defined north of the Wadi Chelif (see Fig 47) The belt of coastal lowland with the Sahel constitutes the Algerian Tell.

Between the two main ranges is the Plateau of the Shotts, consisting of the High Plateau diversified by the shotts, which, when dried up in summer, gleam white owing to deposits of salts. The elevation of this plateau is largely over 3000 feet, but it sinks in the east central region to the depression containing the Shott el Hodna. The Saharan Atlas sink steeply at their southern foot to the South Atlas Trough or Saharan Flexure, followed by a limestone plateau, and contain the Aures massif, which reaches a height of 7600 feet. Wild gorges characterize the Saharan barrier. At each end of the Atlas system there is a coastal lowland, rather narrow in Morocco, but of substantial width in Tunisia. Geologically the Atlas ranges are distinctive in Africa in

that they are a highland region built largely of relatively recent sedimentary rock, mainly limestone. Ancient crystalline rocks are well developed in the High Atlas of Morocco, where intense folding and subsequent denudation have exposed Archæan and Primary rocks. The Shotts Plateau is covered with sandy alluvial deposits largely saline in character.

The greater part of the Saharan region lies below 1500 feet, but there is a number of large depressions, while a great central belt exceeds this elevation. The depressions include that of El Juf in Mauritania, the Tuat depression lying south-west of In Salah, and the great depression that is mainly south of the Shott el Jerid and the Shott Melghir, the latter being some 100 feet below sea-level. The Bodele depression occupies a large area in the Chad territory.

In the Central Sahara is the Ahaggar massif, connected southward with the massif of Air, and flanked on the north-east by the Tasili plateau. From here an elevated belt runs south-eastward through the War Mountains and the Tibesti highland, curving southward to Dar Fur in the Sudan. This high heart of the Sahara only in a few places exceeds 6000 feet; 9000 feet is reached in the Ahaggar and 10,000 feet at several places in Tibesti. It broadly represents the crystalline foundation of Africa, a relic of the ancient plateau of a higher level. Primary rocks flank the higher parts, and there is much intrusive granite, as well as volcanic rocks, particularly well represented in the Air massif. The lower parts of the Sahara have much younger deposits, with large areas covered with derived material either stony or sandy in character.

The Sahara has only a 'fossil' river-system, a system of 'wadis,' or occasional streams, with the principal focus in the Ahaggar-Tasili highlands. These represent the immature river-system developed during the time of the glacial epoch in Europe. In the Atlas region are short rivers, with a considerable winter flow of water, which provide the only drainage to the sea in this large geographical division. Most notable among the rivers of the north-west are the Sebu in Morocco, the Chelif in Algeria, and the Mejerda in Tunisia. The shotts of inland drainage illustrate the aridity of the plateau region on the inner side of the Tell Atlas

The coast is inhospitable, and there are few good natural harbours. It is regular in outline, and silting and the distribution of land-waste have necessitated artificial assistance in modern times to make the ports available for shipping. The best access to the Atlas region was provided by the Mejerda valley (see Fig. 49) which debouches on to the Tunisian littoral, and it was here that Carthage and Rome established themselves most firmly.

Climate. In the Atlas region Morocco is open to Atlantic influences, and is therefore somewhat differentiated climatically from Algeria and Tunisia. It not only contains the highest relief, which stands in the path of the depressions which visit the whole area in winter, but is particularly affected by the cool Canaries Current, which substantially reduces the summer temperature of the coastal region, and is the cause of frequent coastal fogs. The humidity of the air is high, especially in summer, when moist air carried inland is responsible for heavy dews, which provide a considerable amount of moisture of great value to the cultivator. The water is coolest off Cape Ghir, and its effect is illustrated by comparing the figures for Algiers and Mogador.

TOWN	HIGHEST MEAN MONTHLY TEMPERATURE	LOWEST MEAN MONTHLY TEMPERATURE	ANNUAL RANGE
Algiers	77° F	53° F.	24° F
Mogador	68 5° F	57° F	11 5° F

The current is obviously effective in reducing temperature in the summer, while the lower winter temperature at Algiers may be attributed partly to its being somewhat removed from the direct Atlantic influence and partly to its somewhat higher latitude. Farther east, in much the same latitude as Mogador, Tripoli ranges from 54° F to 80° F, the figures for Tunis in between being 48 5° F. and 78 5° F.

The mean temperature at sea-level for the hottest month varies from 75° F to 80° F. along the Mediterranean coast, and exceeds the latter figure in the interior, while that for the coolest month exceeds 48° F. everywhere. Modification due to altitude is illustrated by Constantine (2165 feet) and G  ryville (4280 feet), the

lowest mean monthly temperatures of which are respectively 43° F. and 39° F., the mean temperatures in summer are less affected, owing to the great insolation through a dry atmosphere.

South of the Saharan Atlas comes a sharp increase in the mean temperature of the hottest month, Biskra's figure being 89·5° F., while that for In Salah, half-way between the Atlas and Ahaggar regions, is stated to reach nearly 99·5° F. This is probably the hottest part of the Sahara at this season. The lowest mean monthly temperatures do not greatly differ from those of the Mediterranean margin. The annual range in the Sahara is large, in places exceeding 40° F.

The daily range of temperature away from the coast is everywhere considerable, and in the Sahara is very great indeed. On particular occasions ranges reaching nearly 70° F. have been observed. In the Shotts region a minimum of 18° F. has been noted, and though this low figure is not reached in the Sahara, night frosts in winter are not unknown. Individual summer maxima up to 136° F. have been known to occur, with a sand temperature reaching 170° F., but summer nights are cool only in comparison with the heat of the day. These excessive variations are due to the low relative humidity and absence of vegetation, though that there is actually a good deal of moisture in the air is shown by the frequent deposition of dew.

The rainfall of the Atlas area is mainly effected by depressions forming in the Mediterranean Sea in winter and by the southward extension at this season of eastward-moving storms from the Atlantic. Away from the coast the amount is not considerable, except on the seaward slope of the mountains. The effect of the Canaries Current in reducing rainfall is illustrated by Mogador, which has only 13" of rain, the six months from April to September inclusive contributing only 1·6"; the annual rainfall of Marrakesh, well inland, barely reaches 10". At higher elevations, however, there is a rapid increase, and on the mountains the precipitation is better distributed throughout the year.

The best-watered part of the Mediterranean coastlands extends from Algiers to Bône, with well over 30" of rain. A belt east and west of Oran and the coastlands of Tunisia have little more than half this amount, but 30" is again reached in the Tangier area.

The Barka plateau, projecting northward into the Mediterranean, has a share of this winter rainfall—probably as much as Tunisia. The precipitation often takes the form of violent storms, very destructive in their removal of soil from the surface.

Away from the coast the rainfall depends upon altitude and exposure. Constantine is relatively wet, with 22", but the Shotts Plateau has a total precipitation of from 10" to 15", the amount generally decreasing eastward. South of the Saharan Atlas the rainfall is immediately reduced, Biskra has barely 8". Farther in the desert rain comes only in rare storms, but there is an amount sufficient to feed a large number of wadis in the central belt of highlands. At Biskra the fall is largely in winter, but the storms intercepted by the interior highlands occur mainly in summer.

It should be noted that in the north-west mountain area snow will lie during the winter as low as 3000 feet, while the High Atlas at their maximum elevation carry snow for the greater part of the year. Snow is even known to rest intermittently on the highest parts of the Ahaggar massif.

In front of the depressions passing eastward across the Atlas regions blows a southerly wind from the interior of the land—the sirocco—a dry, hot wind, with its humidity further lowered and its temperature raised as it descends to the coast. It may bring with it a good deal of dust, this is especially the case in Morocco.

Vegetation. As it is warm enough throughout the year (except on the high elevations) for plant growth the character of the vegetation depends primarily upon the amount and distribution of the rainfall. The indigenous vegetation of the Atlas region is distinct from that of the rest of the continent, being allied to that of the adjacent part of Europe. The coast districts and mountain-slopes were originally well wooded, but forest-destruction throughout the historical period, supplemented by the removal of the surface soil by torrential rain, has left only comparatively small forest areas, chiefly on the seaward slopes. Afforestation work has for long received attention. The trees and shrubs are typically drought-resisting, the growing period being the winter rainy season, though deciduous trees are found at the higher elevations. Palms occur in the Tell, with the cork-oak, olive, and Aleppo pine. There is also a good deal of waste land, covered with prickly

shrubs, known as *maquis*. The olive, which is indigenous to this region, provides in its distribution a useful clue to that area which receives sufficient rainfall to be marked off from the semi-desert. On the slopes at varying elevations are found the cork-oak, other oaks both evergreen and deciduous, cedar, argan (producing a fruit rich in oil), thuya, juniper, and pine, with large areas of *maquis*. The French established numerous plantations of eucalyptus, especially in malarial districts—for example, round Blida. The production of *crin végétal*, a fibre obtained from a dwarf palm the growth of which is widespread, has some importance. It is specially useful for mattresses and upholstery, being vermin-proof, and is chiefly sent to Central Europe.

The Shotts Plateau has too little rain for forest, and may be described as the alfa steppe, from the widespread occurrence of alfa (halfa, or esparto) grass. This is a coarse, drought-resisting grass which grows to two or three feet and turns brown in summer. It is widely used by the natives for making rope, baskets, and mats, and is exported for the manufacture of good paper. Drought-resisting shrubs and various grasses are scattered about the alfa steppe, and succulent, salt-loving plants occur in the neighbourhood of the shotts.

The south slope of the Saharan Atlas has little vegetation, in the ravines may be found a few trees, but generally there is only a scattered xerophilous growth. This merges into the vegetation of the Sahara. In the desert the sandy wastes are generally devoid of vegetation, but in some districts there is a widely scattered, low growth of alfa, tamarisk, and other plants, particularly in the beds of the wadis, but nowhere covering the ground with a continuous carpet of plants. The central highlands, on the other hand, support a relatively good pasture. At the oases there are extensive plantations of date-palm, "with their feet in water and their heads in hell," which provide not only fruit, but a little timber for building, palm-wine, and, from the leaves, material for making mats and bedding.

Animal Life. The Sahara not only cuts off the typical flora of Ethiopian Africa from that of the Mediterranean margins, but makes a similar division of the fauna. It is true that the lion, panther, and leopard remain in the more remote parts of the

Atlas region, as do simian representatives, but the characteristic herbivorous animals of the great African grass-lands are absent. European types predominate, and include such animals as the bear, wolf, and fox, while characteristic birds are the snipe, plover, and stork. Even the fish in the rivers are either peculiar to the region, or of European type

People and Development The basic element in the population of the whole of this division is Berber, the name given to the modern representatives of a Caucasian (Hamitic) race that occupied North Africa in prehistoric times. They are represented in relative purity to-day by the Tuareg of the Central Sahara and in the less accessible parts of the Atlas Mountains, notably by the Kabyles and by the Shawiya Berbers of the Aures massif.¹ The Semitic Phœnicians established Utica at the Mejerda mouth (it is now six miles from the sea) about 1100 B.C. This settlement was succeeded by Carthage, created about 800 B.C. Following the Punic Wars, Rome established her hold over the Atlas area, developing a network of roads, particularly in the eastern half, and promoting widespread irrigation. The second important element in the population came with the Moslem Arabs, who invaded North Africa from the East in the seventh century and impressed their rule and religion upon the greater part of the region. Normans, crusading knights, Portuguese, and Spaniards made temporary impressions upon the coastal regions, and the Turks for a time exercised a loose control in the sixteenth and seventeenth centuries, retaining nominal control until relatively recent times. An enormous slave-traffic was developed across the Sahara with the Mediterranean states, and after the expulsion of the Moors from Spain piracy became a dominant interest of the coast towns, menacing all the shipping in the Western Mediterranean. The corsairs were finally suppressed with difficulty at the beginning of the nineteenth century. The Berber language has largely given way to Arabic. The population of the towns is now almost all half-caste (referred to as Moor), though Negroes are also found both here and at the oases.

¹ These have been well described by M. W. Hilton-Simpson. See *The Geographical Journal*, January 1922, May 1924, and January 1925. Fair skins and blue eyes are met with among them.

The modern history of this part of Africa dates from 1830, when France took possession of Algiers, and military conquest was followed by deliberate colonization. Numerous Spaniards, Maltese, and Italians followed the French into Algeria, and Tunisia, which had long been coveted by Italy, already had a considerable Italian population when it became a French protectorate in 1881. Another important element in the population is the large number of Jews, some of ancient settlement, others driven from Spain and



FIG 40 TRADITIONAL PLOUGHING, ALGERIA

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Italy. Later, France and Spain shared Morocco as two protectorates, and Spain still has footholds at Ifni and in the desert on the coast to the south. The French have penetrated the Sahara from the north and from Equatorial Africa, while Italy secured temporarily "a place in the sun" by taking Libya from Turkey in 1912: following the Second World War Libya secured independence. The pacification of the whole area was difficult, and in the Atlas region unrest has led to several important changes in territorial status.

In its early history under Carthage and Rome the Atlas region was famous for its grain and fruit. During the Middle Ages, when the Arab civilization was in its hey-day, it maintained a standard of culture that was in many respects superior to that of Europe,

though agriculture and Roman irrigation-works fell into neglect Civil and other wars promoted stagnation if not degeneracy, and at the time of the French occupation there was but a poor standard of agriculture and productive activity, which, so far as the native cultivator is concerned, is still low, especially in Morocco. The region was, in fact, largely pastoral. The French administration, however, conserved the forests, promoted modern irrigation, encouraged the better cultivation of the characteristic crops, such as barley (a very important cereal) and wheat, and vastly

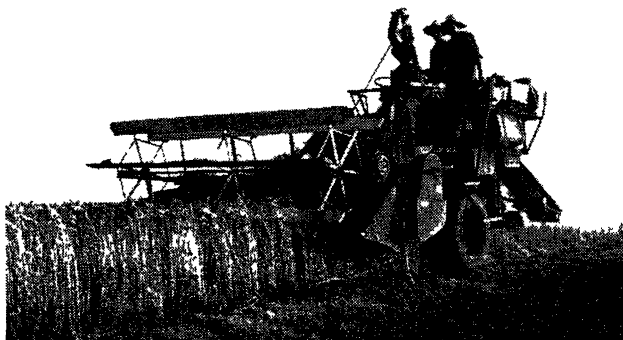


FIG. 41. MECHANIZED HARVESTING, ALGERIA

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extended the cultivation of fruit, notably olives and vines, as well as other varieties for which the Mediterranean climate, allied with irrigation, is suited. Attention has been paid to the cultivation of cotton, though the production is not as yet very important. Some oases have been developed, and fresh ones created by the tapping of artesian water in the southern territories of Algeria and Tunisia. Experimental agricultural stations have been set up, and active measures taken to deal with insect and other pests, including steps to restrict the scourge of malaria

Similar measures have been taken in regard to stock. The typical domestic animals are sheep and goats, and both are receiving scientific attention for the improvement of the breeds. The

Syrian sheep is most common on the plateau, but there are one or two varieties that are closely allied to the merino type. Cattle, horses, asses, and mules are also reared, as well as camels.

Of outstanding importance has been the development of the mineral wealth of the Atlas region. Large areas of phosphatic chalk are exposed in Morocco, Algeria, and Tunisia. Another

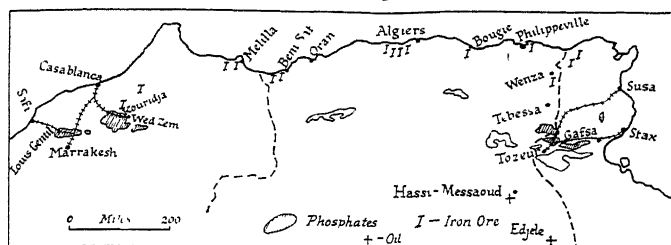


FIG 42 THE DISTRIBUTION OF SOME IMPORTANT MINERALS IN THE ATLAS REGION

important and widespread mineral is excellent iron ore, while oil is produced in Southern Algeria and conveyed by pipe-line to Bougie. A pipe-line for the expanding production is planned to a refinery near Algiers and another to Gabes, in Tunisia.

The population is mainly sedentary in the Atlas region and at the oases, but it tends to be nomadic on the desert margins and on the fringes of the interior highlands. As a whole the Sahara will not admit of easy economic development, for obvious reasons, though the French are energetically pursuing the search for underground water and oil, and have to some extent increased the habitability of the region. Dependence upon air and motor transport is considerable.

Communications have, of course, received much attention for both strategic and economic reasons. Algeria and Tunisia have a relatively good railway-system, there being an east-west main line (Tunis-Constantine-Algiers-Oran), continued into Morocco, with several branches to various ports and to oases in the neighbouring Sahara. Morocco's railway-system is not being fully used, the natural outlet of Tangier was late in securing a railway into the interior. Mineral development in the hinterland of Casablanca has added to its railway connexions. Desert transport

is still rather dependent upon the camel, of which two breeds need to be distinguished—the *jemal*, or slow, heavy beast of burden, and the *mehari*, or riding camel, tall and swift.

The importance of North Africa as a tourist region is reflected in the development of motor-roads, which, of course, have economic value as motor-transport for commercial purposes increases. It is possible to cross the desert in special cars and buses, but this is not to suggest that the problem of desert-transport is fully solved, nor can it be said that there is any sound economic basis for the proposed Trans-Saharan railway. These things do, however, indicate that the desert may in future be conquered.

A feature of the control of North Africa by the French was their endeavour to gain the confidence of the native populations by carefully respecting their traditions and customs (the slave-trade, of course, being abolished). Control was established only after prolonged military campaigns, for Arab and Berber alike resented European intrusion, strong nationalist movements have led to "home rule" concessions. The early colonists in Algeria, who included many German-speaking Alsatians after the Franco-German War of 1870–71, met with great difficulties, for many wild animals—panthers, hyenas, and wild cats—remained, and malaria was rife in large areas, while crops suffered alternately from drought and torrential rain. In Tunisia semi-nomadic tribes were for a long time very unruly. The European population now totals about $1\frac{3}{4}$ million, settlement by French nationals was formerly specially promoted in Tunisia and Morocco. The Nordic elements among the colonists do not seem to be wholly suited to this region, but South European types, like the Spaniards, Italians, and Maltese, do much better, and maintain a considerable birth-rate.

As in so many parts of Africa, the fortunes of the agriculturist fluctuate with the rainfall. The variations of yield are very great. In 1920 Algeria produced 185,000 tons of wheat and in the following year 919,000 tons. The heavier rainfall that promotes a good yield of wheat seems to assist the development of mildew on vines, and the year with a good yield of wheat often results in a low production of wine, and *vice versa*. It is noteworthy that the quality of the wine produced is also dependent upon seasonal differences of climate.

MOROCCO

Morocco derives its name from the Arabic Maghreb-el-Aksa ("the Farthest West"). Of this country it was possible to write at the end of the nineteenth century that "there is no country near Europe so little known" and that it was a "monument of barbarism"¹. The Sultan of Morocco accepted the French protectorate in 1912; this settlement gave to Spain control of the Rif, except for the Tangier zone, which was later internationalized. In 1956 France gave up her protectorate and by 1958 the Tangier zone was incorporated and Spain had relinquished her two protectorates in North and South Morocco. Unified Morocco is now an independent kingdom, though admitting the special interest of France

The Tangier District

This district covers about 135 square miles, the town itself has about 170,000 inhabitants (Moors, Europeans, and Jews). Its importance arises from the fact that it provides the natural port of entry into Morocco from Europe, situated as it is where the coastal plain of Morocco reaches the north coast. By a convention of 1923 it was to pass under the control of an International Commission as from June 1925, but the actual operation of this convention became in 1928 the subject of agreement between France, Spain, Italy, and Great Britain. This arrangement lapsed when Spain occupied the area in 1940. A new statute came into operation in 1953 involving representation from France, Spain, Britain, Italy, the U.S.A., Belgium, the Netherlands, Sweden, and Portugal. The area became part of independent Morocco in 1957, but some particular arrangements in the port of Tangier continue.

Important developments in former French Morocco hindered the expansion of the trade of Tangier, despite the linking of the port in 1927 with Fez by rail.

Economic development in the Tangier zone is unimportant, the wheat, barley, and other crops grown being insufficient for the population. The town, however, has some tourist traffic and a considerable *entrepôt* trade, particularly on the import side.

¹ *The International Geography* (1899)

The Former Spanish Zone

This, stretching from Larache eastward to beyond Melilla, covered about 7,600 square miles. The population is estimated at rather more than a million. Tetuan has 93,000 inhabitants, Ceuta 60,000, Melilla 82,000, Larache (El Arish) 41,000, and Alcazar (El Kasr) 36,000. Most of the 70,000 Europeans live in the towns, as do most of the 14,000 Jews. The Rif Mountains

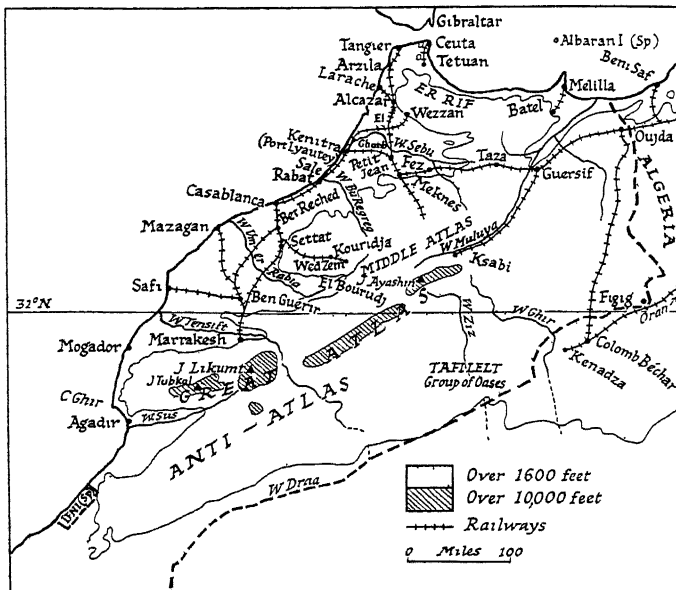


FIG 43 MOROCCO

Casablanca's railways and the Tangier line should be noted. The railway that can be followed from Marrakesh to Oujda is part of a standard-gauge main line that runs through the whole length of these North African territories.

run parallel to the north coast, and the tribes were only subdued with difficulty and with much suffering. The west coast, for which Larache is the chief centre, has a fertile plain now irrigated from a storage on the Wadi Lucus. In the mountains pastoral occupations prevail, sheep and goats being reared, there is a limited amount of agriculture in the valleys. The western

coastal plain and that round Melilla depend upon primitive agriculture, growing chiefly millet, also barley and wheat. Many poultry are kept, and eggs are exported; vineyards are common. Cork-forests remain round Larache and Tetuan, but are hardly exploited. The country is believed to be very rich in minerals. Near Melilla iron, zinc, and lead are worked, the first has some importance. Short railway-lines run inland from Melilla,¹ Ceuta,¹ and Larache. That from Ceuta (a fortified town and the chief port) goes to Tetuan, the most important interior city and the centre of administration; that from Larache runs to Alcazar, through which the Tanger-Fez railway passes. Tetuan has some small industries—leather, pottery, and tile-making; a short railway connects it eastward with the open roadstead of Rio Martín. The trade is mostly with Spain; imports generally exceed exports in value and include sugar and much general merchandise. Iron ore is the chief export and is largely sent to the United Kingdom.

Spain still rules the enclave of **Ifni**, in former French Morocco—about 750 square miles, with 63,000 inhabitants. The rainfall is small, but irrigation permits the cultivation of dates, grain, and vegetables, while the coast villages engage in fishing.

Former French Morocco

Thus, the major portion of the unified kingdom, covered about 134,000 square miles; the population, about 8,580,000, includes 363,000 Europeans, mainly French but also Spaniards and Maltese, and 200,000 Jews, the rest being chiefly Berbers and Arabs, with a number of Negroes. Some 80 per cent. of the Europeans and most of the Jews live in the towns, especially Casablanca and Fez. The territory extends from the Atlantic, over the Anti-Atlas, High Atlas, and Middle Atlas, on to the Shotts Plateau, and into the Sahara in the south, where it is bounded by the Wadi Draa. North of this perennial streams run from the mountains through the Atlantic coast-plain, notably the Tensift, Um er Rabi'a, Bu Regreg, and Sebu, while the Muluya reaches the Mediterranean in the north. The coastal plain rises, at about 800 feet, to a plateau, not much higher, but of a steppe

¹ These towns remain actual Spanish possessions, included in Spain, but treated here for convenience

character because of its distinctly smaller rainfall. The best-watered part of the coastal plain is the Gharb (Plain du Rharb). At the foot of the Atlas is a fertile and well-watered belt. In the south-east, beyond the mountains, are large areas of *hamada* or stony desert.

People The French control of the native peoples in the higher regions was always somewhat loose. In general the population is pastoral, or occupied in relatively primitive agriculture. Large numbers of Arabs in the drier areas are nomadic. Many of the original European colonists came from Algeria and Tunisia, but more recent settlers from France have not always been successful, partly owing to drought. Some have returned to their native country. The colonists are largely engaged in fruit-growing, and by irrigation works the administration has promoted this occupation, besides having established departments for the improvement of native agriculture and stock-rearing. There is important irrigation in the neighbourhood of Marrakesh, in the Sebu basin (serving the Fez district and the Gharb) and in the Um er Rabia basin (serving the Chaouia Plain behind Casablanca). Large stretches of Morocco have underground water, and this is tapped for agricultural purposes.

Forestry and Agriculture There are some $3\frac{1}{2}$ million acres of forest remaining, mostly on the slopes of the Atlas, but some inland from Rabat and Mogador. These forests are being carefully conserved, the most important species in them being the cork-oak and cedar, but they have only local importance at present, although there is some production of cork. A good deal of esparto grass is exported.

In settling only a relatively small number of colonists the French aimed at interfering as little as possible with the established system of land-tenure. The agriculture is therefore mainly in native hands. The coastal plain has a fertile, black, moisture-retaining soil, and one of the best cultivated areas is the Gharb region round the lower Sebu. The other important cultivated belt is at the foot of the mountains. Barley is by far the chief cereal, followed by wheat, largely hard wheat. Maize, sorgho, beans, oats, flax, chicken-peas, are cultivated, coriander, cumin, and canary seeds are produced. Vines are important in the

regions of Fez, Rabat, Meknes, and Casablanca. The most numerous among fruit trees to-day in Morocco is the olive, the cultivation of which has greatly increased in a large area marked by Wezzan, Fez, and Meknes and again in a zone running from south-west to north-east through Marrakesh. Figs, oranges, lemons, and almonds are grown, oranges being specially important round Meknes and Marrakesh, assisted by irrigation schemes.

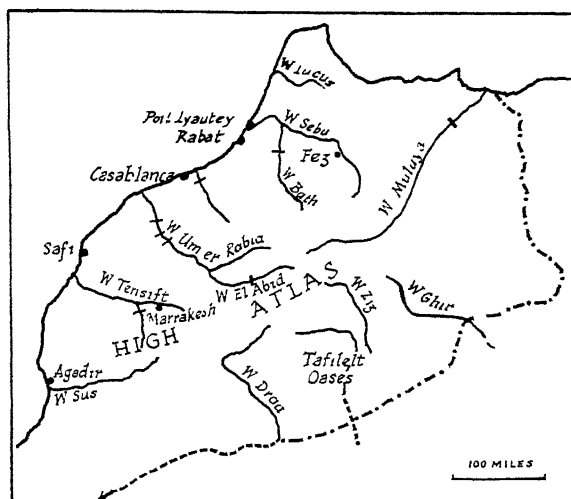


FIG. 44. BARRAGES IN MOROCCO

These usually serve the double purpose of irrigation and power

Cotton, which was widely grown in the eighteenth century, has received attention, and a little of poor quality is being raised in the Fez district. The cultivation of early vegetables for the European market is well established, as also is wine-making. In the Saharan zone the oases are estimated to have about 3 million date-palms.

Pastoral occupations are of considerable importance, and the number of domestic animals has rapidly increased in recent years. Sheep number some 11 millions, goats 8 millions, and cattle nearly 2 millions. Asses and mules are very important for

transport, and there are many horses and camels. The steppe belt is mainly pastoral, flocks and herds are moved up the mountains in summer. There are also many sheep on the Shotts Plateau. Fishing is an important coastal occupation, tunny, sardines, mackerel, and bonito being the chief species caught, curing is carried on at Fedhala, just north of Casablanca.

Minerals Ores of iron, lead, zinc, manganese, and cobalt are worked, though production is not large. Lead, zinc, and manganese come chiefly from an area south and south-east of Oujda, cobalt is found about a hundred miles south-east of Marrakesh, and iron ore, though not of very high quality, from mines to the north of Wed Zem. Anthracite is mined south-east of Oujda, and there is a small oil production south of Petit Jean. But the chief mineral is phosphates, the output of which has much expanded. The first exploitation was in the 'Plateau des Phosphates' round Kouridja and Wed Zem, and this is the chief producing area, another and more recently developed field lies round Louis Gentil, farther south beyond the Um er Rabia. Casablanca and Safi are the exporting ports, in recent years handling between them some 4 million tons of phosphates annually.

Industries, Towns, and Communications With only small coal resources, attention has been given to hydro-electric power. Electricity is chiefly generated in connexion with the dams for storing irrigation water, but none of the power stations is very large. While there are many local crafts, such as weaving and leather work, factory industry is largely concerned with processing foodstuffs and raw materials.

France developed the country chiefly from Casablanca. This city of 680,000 inhabitants (including more than a third of the country's Europeans) has had a remarkable growth. Like other Moroccan ports, it has a naturally poor harbour, but is now protected by two long breakwaters. Being the centre of French penetration and of the railway system, it has attracted the bulk of the overseas trade and is important as a fuelling-port and for its air communications, notably with France and with French West Africa. It is the outlet of the Chaouia Plain and of the Plateau des Phosphates. To-day it is a large modern European-type city with the Moslem population and industrial occupations

largely in its suburbs. Its industries include soap-making, engineering, food-processing, and sugar-refining, while superphosphates are manufactured, pyrites from Huelva in Spain being used. There is a large power-station in connexion with the electrified phosphate line, which runs south-east through Ber Reched, an important junction for Marrakesh (238,000 inhabitants), an ancient city surrounded by 8 miles of walls, in a fertile and well-irrigated district near the upper Tensift, and with carpet



FIG. 45. CASABLANCA
Office Marocain du Tourisme

and leather industries. The line from Casablanca northward goes to Rabat (160,000 inhabitants), at the mouth of the Bu Regreg, the centre of the administration and the chief seat of the Sultan, and then on to Port Lyautey (Kenitra), the second port, serving the Gharb, situated seventeen miles up the Sebu, which is obstructed by a bar. Beyond, the line goes to Petit Jean, where the Tangier railway joins, and on to Meknes and Fez. Fez has 200,000 inhabitants, and is famous for its copper- and brass-workers and wool-dyers. It is an important centre of Moorish culture in a well-watered area that was settled and developed by Moors driven from Andalusia in the fifteenth century. The line goes on through Taza, which is linked up with the main Algerian

line through Oujda. A considerable proportion of the import trade is by this route. A branch running south from Oujda serves a small coal-field. Most railway lines have been electrified, and the road system has been greatly improved

Mazagan, Mogador, and Agadir are ports of local importance. Safi has perhaps the best natural harbour in Morocco and a railway to the Louis Gentil phosphate field, it has grown considerably because of this, while retaining its fishing industry.

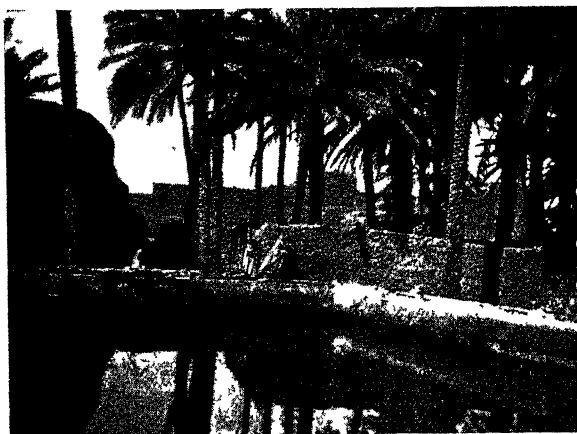


FIG 46. IRRIGATION TANK AND DATE-PALMS, FIGIG

Irrigation is the basis of oasis cultivation

Photo R N Rudmose Brown

The oases of Tafilelt and Figig are noteworthy. The former is the principal caravan centre of Southern Morocco, and is watered by two perennial streams from the Atlas; it is really an irrigated area covering some 400 square miles. The latter lies in the south-east corner of Morocco, hemmed in by mountainous cliffs; it is the largest of the North African oases, and has been described as "a sea of Zenaga palms." The oasis contains several towns. It is just within Morocco, and is a few miles from the neighbouring railway running south from Oran in Algeria.

Internal air services, for which, as for international routes, Casablanca is the chief centre, are well developed

Trade. The total trade is considerable, and about half is with France. Imports are necessarily largely of a technical or manufactured character, including oil, motor vehicles and parts, machinery, iron and steel goods, textiles (especially cotton goods), and clothing, important foodstuffs are sugar and coffee. Normal exports include cereals, olive oil, vegetables, almonds, fruits, eggs, wool, hides and skins, forest products, and esparto, going very largely to France and Spain. The most valuable export is phosphates, sent to many countries of Western and Central Europe, especially to Britain; the Union of South Africa is also a customer for phosphates

ALGERIA

Algeria proper covers about 80,000 square miles, stretching across the Atlas to include the piedmont oases. There are twelve departments Oran, Algiers, Constantine, Bône, Médéa, Orléansville, Tizi-Ouzou, Mostaganem, Tiaret, Tlemcen, Batna, and Sétif. The Southern Territories, extending to the Ahaggar, have a separate administration and cover nearly 770,000 square miles. The total population, including about 840,000 in the Southern Territories, is over $9\frac{1}{2}$ millions. This includes about a million Europeans, considerably more than half of whom are of French origin, and many more are other Europeans who have adopted French nationality. There are many Spaniards and smaller numbers of Italians and Maltese, with about 75,000 Jews. Some three-quarters of the native population are Berbers. The population in 1846 was barely $2\frac{1}{2}$ millions, and then included about 110,000 Europeans

Under the new French Constitution, Algeria and the Sahara return nearly one-sixth of the French Assembly. Sweeping reforms have been planned, including wider opportunities for Moslem advancement and a great development of educational facilities; there is to be French assistance for expansion in all branches of the economy; self-determination seems likely.

The comparatively small area of lowland is mainly coastal, but the Tell is by no means a plain, being diversified by broken ranges—the Sahel—largely composed of crystalline and volcanic rocks, behind which are the principal valleys, opening out to the coast

and responsible for the value of the ports strung along the coast-line. Chief among these lowland areas are the Metidja Plain, commanded by Algiers, and the Sig Plain, the chief outlet of which is Oran; in the latter lies the swampy area marked by the Sebka d'Oran, a large shott. The Plain of Bône is another important area of this type. Among the rivers the Chelif is outstanding, in its basin are several important irrigation schemes. The rivers barely manage to struggle to the sea in summer. The coast ranges are broken by deep gorges, and both they and the Tell Atlas present serious obstacles to communication. The Tell naturally is the region in which most of the agriculture is carried on and most of the population live, terracing is a feature of the cultivation.

The High Plateau is bordered on the south by the difficult barrier of the Saharan Atlas, the northern slopes of which are partly forested (though less so than those of the Tell Atlas), and whose southern and very barren slopes lead steeply down to the South Atlas Trough and the limestone piedmont area marked by the Wadi Mزاب and by the Wadi Jedj, which loses itself in the desert as it trends eastward. These southern ranges are broken by areas of relatively low land projecting northward into the plateau containing the Shott el Hodna, to the east of which rise the Batna Mountains and the Aures massif. Between these two groups the Wadi Biskra has cut the famous gorge of El Kantara as it drains to the Shott Melghir.

People. The Europeans are mainly colonists and farmers, who own some 33 per cent of 18 million acres of cultivated land, and the map showing the distribution of Europeans in Algeria is at once an indication of the relief and the rainfall, for they largely occupy the best lands. Though outnumbered by the natives in the proportion of eight to one, the Europeans contribute heavily towards the total production, it is estimated that the European farmer gets a yield from his land at least twice as great as that obtained by the native farmer. Important among the Berber population are the Kabyles, who in their strongholds round Bougie resisted all invaders until the French subdued them in the middle of the last century. They are monogamous, and their women go unveiled. They depend mainly upon careful agriculture,

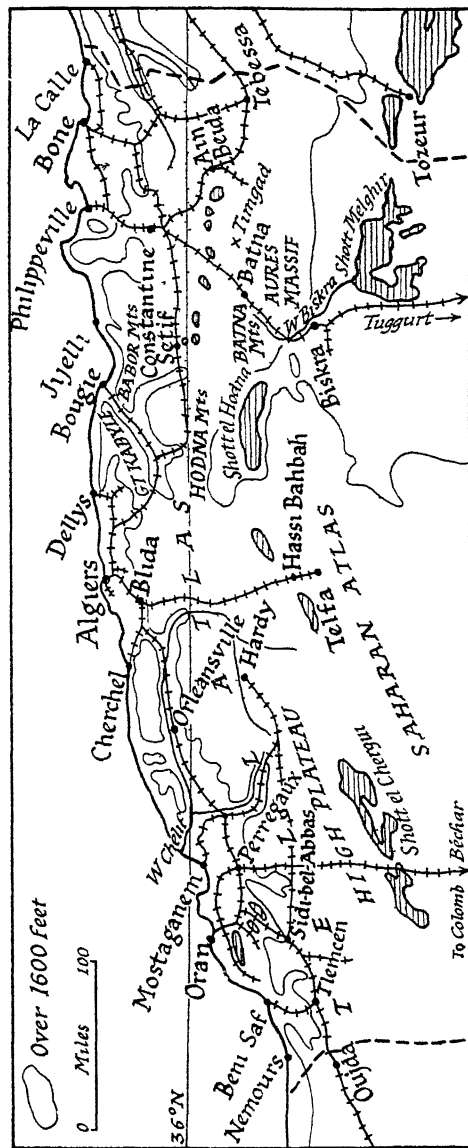


FIG 47. THE ALGERIAN TELL AND THE HIGH PLATEAU

but their villages are over-populated, and their men-folk constitute a big element in the supply of native labour in Algeria. The population generally is rapidly increasing, and population-pressure is indicated by the migration of many Algerians, especially Kabyles, to France. The diffusion of better methods of land use and of cultivation has become urgent.

Resources The forest area covers some 6 million acres, but much of it is of the *maquis* type. The principal cork-forests are behind Bougie and Philippeville. There is a relatively small total area of cedar. Aleppo pine and evergreen oak constitute the largest forests. The forests supply fuel, timber for local purposes, such as railway-sleepers, and bark for tanning. The greater part of the area of Algeria is suited only to pastoral pursuits.

Large natural tracts of alfa remain, especially in the Oran province, on the High Plateau, but here pastoral occupations prevail, as in the highlands generally. The proportions of the domestic animals are similar to those of Morocco, there are more than 6 million sheep, 3 million goats, and 800,000 cattle. Live sheep are exported, and there is a large wool clip. The coastal fisheries have some importance. Sardines, anchovies, and tunny are caught, while sponges and coral are collected.

Wheat, mainly hard wheat, and barley rival each other as the principal cereal crop, though oats are also widely grown. These winter crops, the basic food of the population, may or may not provide a big surplus for export, according to the season. Maize is also cultivated. Market gardening has attained considerable dimensions, especially in the hinterlands of Algiers and Oran, and large quantities of early vegetables (artichokes, tomatoes, potatoes, beans, and peas) are raised. There is a very large production of wine, but the quantity varies greatly with the season, the annual production generally being between 300 and 400 million gallons from nearly a million acres of vineyards. Some of it is consumed locally, and much is exported to French colonies, and to France for blending purposes. A good deal of the wine, however, is not suitable for blending, owing to high acid content. In recent years there has been a great increase in the production of tobacco for both local and export trade, and a considerable manufacture has arisen. A big yield of olive oil is obtained from

some 18 million olive-trees. Flax is grown, and efforts are being made to promote the production of cotton. Some attention is given to mulberry cultivation for silkworm-rearing.

Fruits are extensively grown, oranges, especially mandarins, grown by colonists, plums, figs, citrons, pomegranates, almonds, and bananas are all important. Irrigation schemes, of which there are about a dozen—mostly small—in the northern valleys, irrigating a total of about 200,000 acres, help this development. In the oases of the south the growing of dates for export is being rapidly developed.

Minerals. Extensive deposits of high-grade iron ore are worked along the Wadi Tafna, behind Beni Saf, and in the hinterlands of Algiers, Bougie, and Philippeville; the deposits at Wenza are particularly important. The production is normally in excess of 2 million tons annually. Phosphate of lime is extensively worked in the Constantine province south of Tebessa, with vast deposits still awaiting full development; these deposits are continued eastward into Tunisia. The annual production reaches some 600,000 tons. Considerable quantities of zinc are raised near Batna. Excellent oil occurs in vast quantities but at great depths at Hassi-Messaoud (see Fig 42), and at Edjele farther south. By 1961 two-thirds of France's needs may be produced here.

Industries, Towns, and Communications Manufactures are of some importance in Algeria. Superphosphate plants are met with at Bône and Philippeville, and tobacco factories, flour-mills, and olive-oil refineries exist in the principal coast towns. Native crafts include carpet-weaving, pottery, and leather-work.

Algiers, in a commanding position in the Western Mediterranean, with about 360,000 inhabitants, has a poor natural harbour, like most of the coast towns, but was for long the headquarters of the Barbary corsairs. It now has modern protection for shipping and harbour facilities, and has become the great commercial centre, dealing with nearly half the total trade. It lies encircled by hills, and the modern town contrasts strangely with the Casbah, or native city, so picturesque, if not otherwise attractive to the European. A large majority of the population is European. It has a variety of industries, chiefly of the processing type, exports both Tell and plateau products, as well as dates and

iron ore, and is the principal centre of the big tourist traffic that has sprung up. In recent years its trade has not grown as rapidly as that of Oran. Oran (300,000 inhabitants) has a good natural harbour, and is an important port for wine, cereals, and esparto, serving a fertile area and engaging in trade with Morocco and with Saharan oases *via* the railway to Colomb Béchar. Philippeville and Bône are phosphate ports, and there are a number of other ports of little more than local significance, such as Bougie,

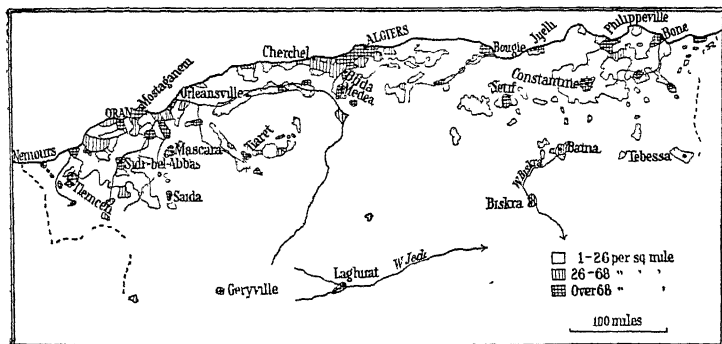


FIG 48. DENSITY OF EUROPEAN POPULATION IN ALGERIA

Note the concentration in the hinterland of the larger ports

Based on a map in "*L'Algérie économique*," by V. Demontès

Mostaganem, and Beni Saf. The chief interior city is Constantine (population 150,000), situated in a position of extraordinary beauty and grandeur, almost surrounded by a deep and narrow gorge, crossed at one place by a natural bridge. This town is in a rich grain-growing district (which extends westward past Sétif) and has woollen and leather industries. Best known among the oasis towns is Biskra, an important tourist centre, with date-groves and orchards and a caravan terminus on the railway to Tuggurt—like Old Biskra, a mud town. Tuggurt, at the time of the French conquest, was decaying, owing to the filling up by the desert sand of the numerous wells upon which it depended. The French have driven many new wells in this area. One boring in this neighbourhood at a depth of 600 feet produced a flow of

10,000 gallons per minute, creating an oasis now possessing 80,000 palms. The principal city of the Mزاب country (the piedmont, inhabited by a strict Mohammedan sect) is the oasis of Ghardaia, an important sheep-market with a substantial domestic carpet industry. Other important oases are Wargla, Ain Sefra, and Laghuat, these oases, like Tuggurt and Ghardaia, are in the Southern Algerian Territories. These territories are further considered later in this chapter. Besides the increasing oil production at Hassi-Messaoud, exported via Bougie, a small amount is produced in the Kenadza-Colomb Béchar district, connected by rail to Oran.

The old Roman road-centre of Tebessa and the famous ruins of Timgad are not the least of the attractions of Algeria for the tourist. Tlemcen and Blida are notable Moorish cities.

The railways, supplemented by more than 5300 miles of national roads, have a total length of nearly 3000 miles, and are characterized by lines running inland from the coast. The main line, however, is roughly parallel to the coast from Tunis into Morocco, passing through Algiers and along the Chelif valley, where Orleansville is the important centre for a large irrigated area based on a big dam on the Fodda tributary joining from the south. Before reaching Oran, the railway passes through Perregaux, another centre of French settlement and farming.

Algiers, Oran, and Bône have airports, and there are numerous smaller airfields. Algiers, notably, is on air routes from Europe to many countries of Africa.

Trade. Algeria has a large trade, of which fully 70 per cent. is with France. Almost all the imports are from France, which sends in particular, sugar, textiles, automobiles, engineering products, and electrical equipment. Other imports include coffee, butter, leather and rubber goods, and a little coal. By far the leading export is *vin ordinaire*, taken very largely by France, and iron ore is the chief mineral sent away, though by 1962 oil should be important, otherwise exports are very similar to those of Morocco. The United Kingdom has a small share of the trade in manufactured goods, notably automobiles, and takes a very large proportion of the iron ore as well as a good deal of barley and esparto; most of the esparto, however, now goes to France.

TUNISIA

Tunisia became independent in 1956 and was proclaimed a republic in 1957. It covers about 50,000 square miles and has a population of about 3,800,000. Of these the majority are Moslems (Berbers and Arabs), but there are about 175,000 Europeans and some 80,000 Jews; half of the Europeans and of the Jews are in Tunis. In 1911 Italians were twice as numerous as the French, but the French took steps to secure French citizenship not only for large numbers of Italians but for other Europeans including Maltese, so that the majority of Europeans are now classified as French. The republican government recognizes the economic dependence of the country upon France, France at present retains its naval base at Bizerta.

Tunisia faces the sea on two sides. Physically it consists of the extreme end of the Atlas highlands, with the adjacent lowlands, separated from an upland region in the south by the Shott Melghir, which is well below sea-level and represents, with the Shott el Jerid, an earlier extension of the Gulf of Gabes. The Mejerda, flowing into the Gulf of Tunis, separates two of the Atlas ranges, and is the most noteworthy river. Several regions may be distinguished: the Algerian Tell, with the adjacent and relatively well-watered mountains, continuing into Tunis, the irrigated Mejerda valley, with its cultivated alluvial plains by the Bay of Tunis, the Cape Bon peninsula; the Sahel, which is the name applied to the broad eastern lowland, the plateau occupying the west of the northern half of the country, and the Saharan region of oases in the south. The northern part has the best rainfall, but this declines in the south of the Sahel to only 10". Indeed, the Sahel is drier than the Shotts Plateau, and the pastures are very scanty. The Saharan area is largely dependent upon underground water, but it is noteworthy that numerous large springs of both hot and cold water gush out from the limestone of the mountains watering rich oases in the neighbourhood of the shotts. Jerba Island shares the characteristics of the opposite mainland.

Production. After the establishment of a French protectorate in 1881, and the settlement of numerous colonists, many nomadic pastoral tribes were pacified and a policy of agricultural

development and education pursued. Even so, nearly 30 per cent of the area is useless for agriculture, and half of the rest may be

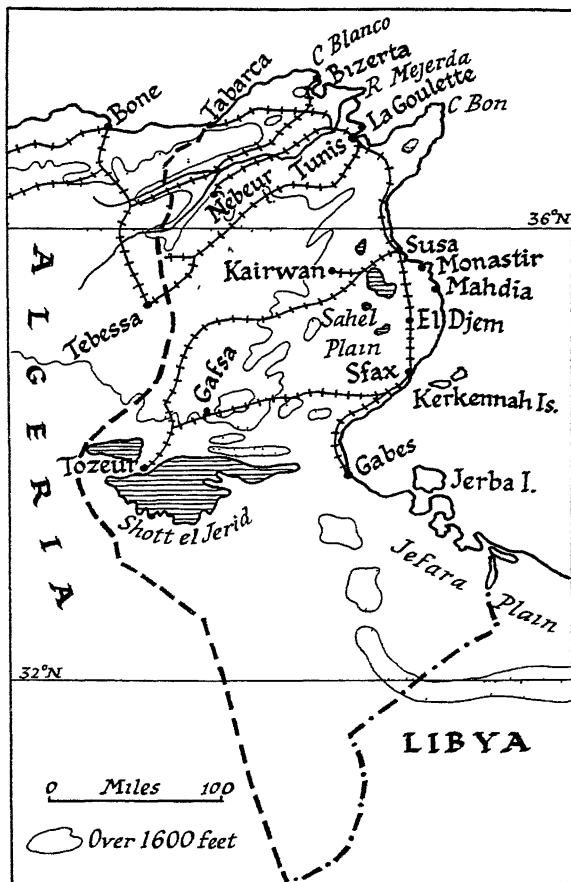


FIG 49. TUNISIA

described as unproductive. A feature of the farming is the large number of agricultural co-operatives that have been established, and the use of tractors is spreading. The forested slopes and alfa

steppes found in Algeria continue along the highlands. Cork, briar-wood, and alfa are all exported. Half of the cultivated area, principally in the northern valleys, is under cereals, of which wheat is the chief, followed by barley. Oats are very much less important. Though extensive vineyards are found, the production of wine is barely 8 per cent of that of Algeria, but the olive crop is greater. Olives are chiefly grown in the Sahel, despite its aridity and absence of running water, with Sfax, Mahdia, and Susa (Sousse) as important centres; there are now over 23 million trees. Tunisia specializes in olive oil, the high quality of which is guaranteed by the Government; inferior oil is imported for the poorer classes. Citrus fruits are specially grown on the fertile soils of the Cape Bon peninsula. There are some $3\frac{1}{2}$ million date-palms in the country, almost half being in the oases of the Shott el Jerid region, while there are 500,000 in the Gabes oasis and a similar number on Jerba Island. The Degla variety is specially cultivated for export, notably in the Jerid region. Almonds, pistachio-nuts, and henna are other crops.

The Mejerda basin clearly provides the principal opportunities for conserving water for irrigation, and a series of dams on the river and its tributaries is being developed to add to its present limited usefulness. (These dams will also serve power development.) The principal objective is the irrigation of some 100,000 acres in the Mejerda valley, west of Tunis. It may be added that useful ground-water resources are being tapped in the Jefara and in the south of the country.

Although much attention has been given to animal husbandry and there was a great increase in the number of domestic animals in the period between the two World Wars, there has been recently some decline. Cattle are relatively few, there are fewer than 3 million sheep, while goats number $1\frac{1}{2}$ million. Pastoral tribes keep their flocks on the poor lowland pastures of the Sahel in winter and drive them up the mountains in spring. Camels number about 250,000, and are still used to a considerable extent in native agricultural work. Fishing is not extensively pursued; the usual Mediterranean varieties of fish are caught, with Sfax and Mahdia as the leading fishing ports, sponges have some importance.

The mineral output is considerable. The phosphate production in the Gafsa area is some 2 million tons annually, roughly equaling that of Algeria. The production of iron ore, however, is normally only a third of the Algerian output, it comes chiefly from the mountainous north-west of the country, where zinc and lead are also mined. Zinc and lead also come from districts lying south of Tunis. There is a considerable production of salt by evaporation along the coast. Industries are unimportant; they include milling, olive oil, and soap-making. Indigenous crafts in wool and leather include carpet-weaving.



FIG 50 A PHOSPHATE MINE NEAR GAFSA

French official photograph

Towns. The principal town is Tunis, with 680,000 inhabitants. This port is the successor of Carthage, and lies at the head of the Gulf of Tunis, on a shallow lagoon through which a channel for shipping has been cut. This lagoon was once the outlet of the Mejerda river. It serves the Tell, the plateau, and the Cape Bon peninsula, and, being in the north-east corner, between the eastern and western Mediterranean basins, is favourably situated for Mediterranean traffic. It does a large general trade, and is the leading port as regards the number and tonnage of the vessels using it. It attracts large numbers of tourists, for among the resources of its hinterland are the remains of many Roman and

pre-Roman towns Carthage lies some 12 miles to the north-west. The outlet of Tunis is La Goulette, at the entrance of the lagoon, a fishing port Air routes link Tunis with Marseilles, Rome, and many parts of North Africa Tunis is connected with the main Algerian railway, and southward through Susa (a port for the Sahel) and El Djem (which has a vast Roman amphitheatre) with Sfax The immediate hinterland of Sfax is a dry pastoral region, apart from its olive-groves, but a narrow-gauge railway runs inland to Gafsa, where the principal Tunisian phosphate deposits are located The value of the trade passing through Sfax is nearly as great as that through Tunis. It is also the chief centre of the sponge and other fisheries

Inland from Susa a railway-line runs to Kairwan, the old Mohammedan capital, with a magnificent Grand Mosque built from materials obtained from earlier Roman buildings, and to Tozeur, near the Shott el Jerid. This oasis has 250,000 palms, as well as groves of oranges and pomegranates. The only other towns of importance are Bizerta, on the north coast, a naval and military station, with a large inner harbour, and in an excellent strategic position, and Gabes, at the head of the gulf of the same name, with a perennial stream running through a belt of palms about 4 miles long and 1 mile wide

Trade. The total trade of Tunisia is little more than a quarter of that of Algeria Some three-quarters of the imports are from France, which country takes nearly half the exports; Italy and Algeria are also good customers Textiles, chiefly cotton goods, constitute the largest import category, and the range of imports generally is similar to that of Algeria The cereal export depends on the season, but is often large, as is that of olive oil, wine, and esparto; fruits, cork, and sponges are also notable. Phosphates form the leading mineral export, but substantial values of iron and lead ores are also sent away

THE SAHARAN REGION

The Sahara¹ is by no means uniform in its physical features. Highlands and basins occur, and although the term 'desert' may be applied to it as a whole, there are important differences in the

¹ See *Le Sahara Français*, by Professor R. Capot-Rey

several times a year. Sometimes the wadis provide water for the oases, but very important also is the vast quantity of water that lies underground in this part of the Northern Sahara. Wadis from Tibesti drain to the Bodele depression, which formerly appears to have been filled with water from Lake Chad.

Intense insolation through clear skies by day and great radiation during the starry nights account for variations of temperature which cause the fracturing and splintering of rocks. Wind has



FIG 52. THE WADI SAURA AND KERZAZ OASIS, TO THE
SOUTH OF BENI ABBES

A remarkable feature of this wadi is that it separates *erg* desert on the one hand
from *hamada* desert on the other

Professor E. Gautier and the Algerian Government Photographic Service

been effective over a long period in modifying all surface features and in wearing down fragments into sand. Intense heat gives rise to the wind-storms, known as *simooms*, which fill the air with sand and drive fine particles into the pores of the skin. Rare rain-storms—brief but intense—can do little or nothing to modify the prevailing aridity. On the southern margins, towards the West African region, the average rainfall (summer) is a few inches per annum, and gives rise to a scattered drought-resisting growth. The highlands are noteworthy for a small rainfall, which may

hamada and *erg* The aquifer has uniform facies with little clay (non-continuous) and is undisturbed, it varies from 150 to 2000 feet in thickness and represents a massive and widespread water reserve. The water is often genuinely artesian, giving rise to 'gushers' as at Gurara, for when overlain by impermeable strata it is under pressure

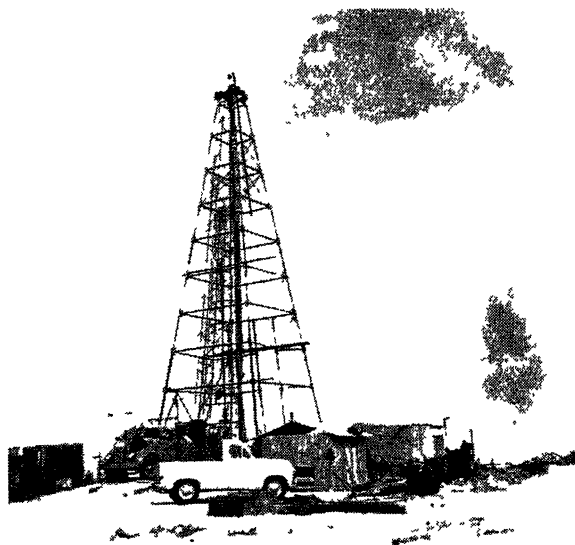


FIG 53. DRILLING FOR GROUND WATER,
SOUTHERN ALGERIAN TERRITORIES

Service Algerien d'Information et de Presse

South of the Saharan Atlas, it lies relatively near the surface as at El Golea and somewhat deeper at Mزاب; the wells at these places are almost fully artesian. At Zelfana, west of Ghardaia, it is at 2400 feet, and it lies below the great depression south of the Shott Jerid, in which region it is hoped to bring to life the 'dead' valleys that reach the depression from the west. In the depression at Tuggurt there have been important wells for many years irrigating groves of the *degla* variety of date. In Salah gets much water from the aquifer.

People. There is a considerable diversity and mixture of peoples in the Sahara. Broadly speaking, latitude 17° N. separates Arab and Berber from negroid types. Thus in Mauritania Arabs and Berbers are found in the north and blacks in the south. Ahaggar and Air are inhabited by the Tuareg, "the people of the veil," an extraordinarily interesting Berber type. The men go veiled, scorn manual work despite their strong frames, and constitute a race of camel-men who long dominated the chief Saharan caravan routes. They are not numerous, and it seems probable that they will die out; the only occupation that appeals to them is marauding, and they are mixing more and more with Negro types that the slave-trade brought to the oases. To the east, in the Bodele and Tibesti regions, the inhabitants are chiefly Tibbu types—Hamitic Negroes, and the only Negro people to maintain themselves in the Sahara—with a sprinkling of Arabs. In the north and west Arabs are chiefly found—settled Arabs, living in flat-roofed mud houses, at the oases, and nomadic types, living in tents, wandering in the semi-desert from well to well. The need for pasture and water has largely contributed to the unruliness of the Saharan peoples, and their resistance to European penetration has been frequently aggravated by a fanatical Mohammedanism. The last stronghold of the slave-trade was the Wadai region, lying east of Lake Chad. The French until recently had almost complete control of the western Sahara.

The impact of the modern world is felt even in the Sahara. Where artesian water or oil have been tapped, as in the Southern Algerian Territories, the oasis population has substantially increased, notably at Wargla and El Golea, but unless these or some other favourable economic factors are at work the oasis population appears to be declining. There is a drift of population to the towns of the bordering regions of North Africa—mostly of young men, the average age of the oasis population has risen, cereal production is inadequate so that most oases import grain. It is stated that over the last hundred years, Agades (in Southern Air) has lost half its population, and Ghat (in South-west Libya) has lost three-quarters. There is also the decline in the number of camels largely used in cultivation. Locally minerals, such as oil at Hassi-Messaoud, or tourism may mitigate the decline.

Sometimes the local lowering of the water-table (probably temporary) is given as the reason for declining prosperity leading to reduced flocks and herds and many dead palm-trees that are not replaced. Emigration of people of working age so that less water is raised leads to slow decay. These scattered settlements are scarcely served by modern air communications or by the slow development of specialized motor transport, using very low-pressure tyres and for which *reg* desert, if not too coarse, provides the most favourable terrain.

Largely arbitrary political boundaries demarcate republics that secured independence from France in 1960. In the west is Mauritania; the Southern Algerian Territories spread to Ahaggar, south of which is the greater part of both Mali and Niger, including the districts of Adrar, Air, and Kavar, except for Southern Algeria, these in the past have been politically linked with West Africa. Chad, linked with Equatorial Africa, covers the regions of Kanem, Bodele, Borku, and Wadai.

Mauritania. Mauritania is bounded on the south by the Senegal and on the north by Rio de Oro. It contains no considerable elevation; the coast is marked by sand-dunes, behind which are salt lagoons. The area is about 415,000 square miles and the population about 546,000, with a few hundred Europeans. There is a little rainfall in the south, which produces a belt of bush savanna, but the important part of this region is a strip, about 25 miles wide, by the Senegal which receives an annual inundation from the summer flood. This is known as the Chemana (see Fig. 98). Here Sudanese hoemen grow maize and millet, and the French have encouraged the cultivation of cotton, rice, and castor oil, but development is hindered by lack of labour. In the southern region zebu cattle, sheep, goats, asses, and mules are reared, and acacia-gum is collected. Arabs and Berbers are found in the interior oases, notably in the Juf depression, cultivating principally dates, but also rearing camels and Barbary horses. Dates are exchanged for Chemana products. Considerable quantities of salt are obtained from interior saline pools (*sebka*) and from the coastal lagoons, and this industry, which has always been important in connexion with trans-Saharan traffic, could be considerably increased. An important fishing industry, developed chiefly by

Breton sailors off Cape Blanco, has grown up. Fish—dried, salted, and smoked—is exported from Port Etienne in very large quantities, it is sent inland, and to West and Central African territories. Development work has begun on large resources of high-grade iron ore at Fort Gouraud, copper ore is another resource. The capital is Nouakchott



FIG 54 THE OASIS OF IN SALAH

This oasis is located among shifting sand-dunes. The sheet of water is artesian.
Professor E. Gautier and the Algerian Government Photographic Service

Southern Algeria These territories contain the *erg* deserts in the north, with the region of wadis and oases that has already been discussed in connexion with Algeria and with underground water. The importance of the French hydrological work is indicated by the doubling of the population of these territories in the last forty years. The tapping of underground water has been extended far to the south, to the great benefit of the oasis regions of Gurara and Tuat, in which Adrar and In Salah are respectively located. Farther south is the Ahaggar massif, with its peripheral villages of hardened clay houses, its wadis, and its upland and valley pastures. There is little cultivation. The Tuareg breed camels, and there are large flocks of goats and sheep, as well as asses and a few zebu cattle. This region, mainly of *hamada* and *reg* desert, was finally conquered in 1903. A rich tomb dating from A.D. 600

suggests that it once held a more prosperous population. The French have established an administrative post (Fort Laperrine) at the old caravan centre of Tamanrasset on the south-western margin of the Ahaggar. For oil in these territories, *see* p. 89.

Mali. That part of this republic lying north of the Niger bend lies in the Saharan-zone and includes about half the area and a small fraction of the population. A south-western projection of the Ahaggar stretches into the north-east of the area, giving rise to the wadis and oases of the Adrar region with typical associated husbandry. In the north-west is Taodeni, perhaps the best-known salt-producing area of the Sahara.

Niger. Part of this republic is in the West African region; the part in the Saharan region includes the Air plateau, with its wadis draining westward, and the oasis area of Kavar. Perennial streams, notably the river of Agades, descend from the peaks of Air, which exceed 6000 feet. This area is similar to the Ahaggar. The Tuareg inhabitants depend largely upon the milk and cheese of camels and goats. An ancient caravan route of considerable importance passed from Zinder through Agades and the Kavar oasis to Tripoli. Salt is obtained at Agades and Bilma, and a little tin is mined in Air. The southern zone bordering on Nigeria is a savanna belt, with most of the population, chiefly inhabited by the sedentary Hausa, who cultivate millet, maize, rice, wheat, ground-nuts, tobacco, and cotton, and keep numerous flocks and herds. The territory (area 493,000 square miles; population, 2,460,000) is administered from Niamey, which would become very important should it be served by a railway.

Chad. This republic (500,000 square miles, with about 2,600,000 people) is politically linked with the Central African region; the Saharan area, by far the larger but with only a very small proportion of the population, includes the Tarso Mountains of Tibesti and the extensive Bodele depression, which stretches southward to Lake Chad. The Tibesti highlands share the characteristics of the Ahaggar and Air, except that cultivation is more important, as the population is to a greater extent sedentary and as there are large oases along the margins. In the great depression there is plentiful underground water, and wells are numerous; the limited rainfall on the southern margins permits

pasturing Here the dum-palm is common, and there appears to be a plentiful growth of wild cotton. Unfortunately, there is only too obvious evidence that Lake Chad is drying up, the inunda-

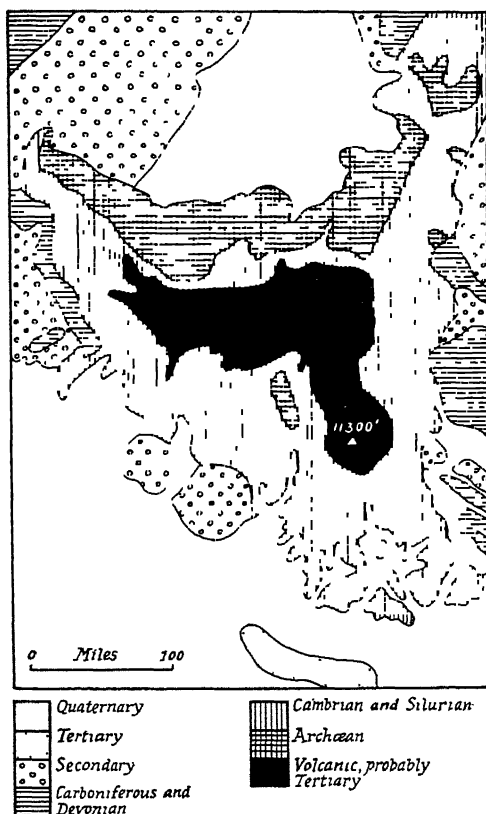


FIG. 55. THE TIBESTI HIGHLANDS—GEOLOGY

Erosion has exposed in places the crystalline foundation, extrusive rocks form the highest parts

Simplified from a French Official map

tions in the summer—which vary in extent from year to year—show in general a progressive restriction. The water of Lake Chad is relatively fresh—often fresher than well-water; this is attributed

to the enormous growth of aquatic vegetation absorbing the dissolved salts. Lack of water and the consequent lapse of cultivation allow windswept waste still further to reduce the area of the lake. Occupations in this marginal zone are those typical of the dry savanna. Salt is an important product in the Borku and



FIG. 56 FORT LAMY, CHAD

A military and administrative post

Photo Information Afrique Equatoriale Française

Ennedi districts of the north-east of the depression. The principal towns are Mao in Kanem and Abeshr in Wadai, both reduced by the French in 1903. These towns, especially the latter, were centres of a big and destructive slave-trade, and Abeshr commanded important caravan routes to Benghazi *via* Kufra and to the Nile *via* Dar Fur and Kordofan. On the southern margin of the Saharan area Fort Lamy has importance as a junction of air routes.

SAHARAN ROUTES

It is perhaps unnecessary to emphasize the dependence of desert transport upon the camel, the only animal that can cross the waterless wastes. The positions of oases decide the course of the caravan routes. In a region without obvious landmarks the sun

and the stars are guides, and the desert training of the caravan-leader is of supreme importance. But caravan trade has shrunk to relatively small dimensions, slave-trading has been abolished, and railways to the Mediterranean tap the Northern Sahara, while the Sudanese zone has had its traffic diverted westward and southward. Economic conditions would not seem to justify the continuation across the Sahara of the existing line from Colomb



FIG. 57. EN ROUTE FOR AHAGGAR

The Sahara is regularly crossed by motor transport to-day
Service Algerien d'Information et de Presse

Béchar; this has long been proposed for the purpose of linking Algeria with the potentially important irrigable region of the Middle Niger. It seems a less practicable scheme than that of linking the Niger bend with the existing West African railways.

Motor transport is not as yet of much significance in connexion with Saharan communications. Existing 'bus routes' include one from Algiers to Zinder in the Niger territory, and one from Colomb Béchar to Gao on the Middle Niger. Vast areas of the Sahara are totally unsuited to motor transport. Air routes from the north cross the barrier to West, Central, and East Africa; El

Golea in the Southern Algerian Territories is the most notable air-route junction in the area being considered.

LIBYA

The United Kingdom of Libya is a federation which includes Tripolitania, Cyrenaica, and Fezzan. This great area, the coast zone of which flourished when the Romans tapped and conserved its water resources, decayed under Turkish rule, it became an Italian colony in 1912, was freed during the Second World War and, by a decision of the United Nations, was established as an independent country in December, 1951. The total area is about 680,000 square miles with a population estimated at 1,136,000 including some 45,000 Italians and a few thousand Maltese. Practically all the Europeans live in Tripolitania. The mass of the population is fundamentally Berber, it includes, however, a large proportion of Negroes who are there as a result of the old slave-trade across the Sahara. The difficulties confronting the new state arise, not only from vast distances and utterly inadequate communications, but from the relative areas and populations of the constituent parts. Tripolitania, with less than one-sixth of the total area, has three-quarters of the total population, Cyrenaica has half the area and only 300,000 people, while Fezzan, covering one-third of the area, has but 55,000 inhabitants, mostly nomads. The population, too, is mainly strung along the coastal belt. Benghazi and Tripoli, 400 miles apart by air and 700 miles by the coast road, were joint capitals until 1957 when administration was concentrated in Benghazi. British and American aid (associated with strategic agreements) is at present maintaining the economic stability of the country. This would be more certain if oil came to be produced. Oil has been found at a number of places; the principal 'strike' has been at Zelten, some 200 miles south of Benghazi. From Zelten a pipeline is being constructed northward to a new port on the coast.

In Tripolitania is a coastal plain, the Jefara, of substantial width, backed by a limestone plateau rising to an average height of 2500 feet that merges southward into the red sandstone *hamada* desert of Homra, beyond which is the depression of Fezzan, a typical *erg* desert with oases. Cyrenaica has the narrow

coastal plain of Benghazi that rises by three well-marked steps to the limestone Barka plateau (the Jebel Akhdar), which reaches 3000 feet. South of this is an arid depression that rises beyond to the sandstone plateau of the Libyan Desert, containing the Kufra group of oases, inhabited by a warlike Mohammedan confederation known as the Senussi. The eastern boundary follows longitude 25° E, diverging somewhat in the north, where adjustments

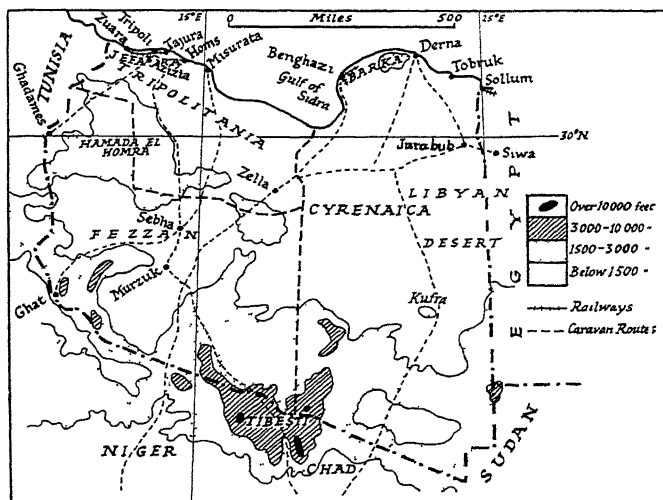


FIG. 58. LIBYA

were made by agreement with Egypt. The southern boundary is marked by a belt of much higher land, exceeding 9000 feet in the Tibesti highland. The territory as a whole is arid, the coastal rainfall, which comes in winter, is not large enough to yield surface streams except in the neighbourhood of Derna, the Barka tableland, the best-watered area, has remnants of former forests. A small rainfall is also met with on the plateau behind the Jefara, sufficient for a good deal of cultivation, and on the southern belt of highland, which has pastures and oasis settlements.

Features of the climate include the *ghibli*—a hot, desiccating wind from the Sahara, notable in autumn, which, however, is

useful in ripening dates—and the relatively frequent drought years. The barley crop—barley is the staple food—was only 8000 tons in 1947, yet reached 140,000 tons in 1949

The coastal belt contains varying types of land, but in general the soil is sandy, lacking in humus, and of low fertility. The Jefara has oases, sand-dunes, salt lagoons, and steppes. Cultivation has long been carried on at the oases and on the seaward-facing slopes of the escarpment; the Italians tapped underground water and established colonists as farmers with its assistance. The crops include dates, olives, figs, oranges, saffron, together with wheat and much barley, less important are tobacco, castor oil, and henna, while colonists often grow early vegetables. Olive-oil production is becoming very important as Italian-planted groves come increasingly into bearing. Attention has been given to ground-nuts, the production of which, as of oranges, seems likely to increase; a little wine is produced by Italian farmers. The dunes have been largely fixed by afforestation, and the steppes, besides providing pastures for sheep and goats, are rich in alfa grass. The Barka region grows, in addition to the crops already mentioned, bananas in the Derna district, while good cattle pastures exist on the plateau, Derna, with 36,000 inhabitants, is an important centre of mixed farming.

The coastal belt has the bulk of the $2\frac{1}{2}$ million date-palms in the territory, as of the three-quarters of a million sheep and half a million goats. Cattle and camels number about 100,000 each.

The principal interior population, which includes small numbers of nomads, is, of course, at the oases, the largest of which are in the western half of the country. The chief are Murzuk, Ghat, and Ghadames, the last being watered by warm springs. The first is on the route from Tripoli to Kavar, and the other two on that to Kano. Each is characterized by large *fonduks*, or walled spaces where caravans are accommodated. Among other crops dates of high quality, figs, and almonds are grown, while a declining caravan trade is served. The largest oasis settlement in Fezzan is Sebha, with 1000 people.

Tunny- and sponge-fishing is pursued along the coast, divers being employed for the latter, while a good deal of salt is obtained from coastal lagoons.

Italy's legacy includes harbour works, roads, railways, water works, and settlement. Many hundreds of selected families from Italy were, after careful preparation, settled on 50-acre farms in those parts of the littoral where an adequate water-supply could be assured, the deeper wells being worked mechanically.

There is little industry apart from handicrafts; weaving and leather work are typical. Barracans (Arab cloaks) are specially made at Tripoli and carpets and rugs at Misurata. In general, the people live at subsistence level, and the death and infant-mortality

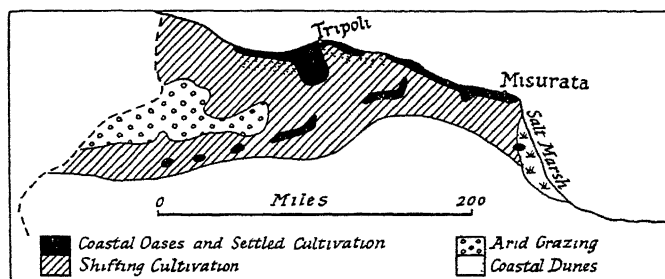


FIG 59 LAND USE IN TRIPOLITANIA

rates are high. While there are modern villas and cement farm houses, dwellings are commonly made of a variety of materials, including mud bricks and palm-trunks and -leaves, or may be merely tents.

Winter storms render the coast unsafe, except where modern improvements have been effected. The principal towns are coastal, and the most important is Tripoli (population 160,000, including many Europeans). Tripoli has a large modern section and modern port facilities, although it has suffered from the general decline of caravan traffic, it is still the chief Mediterranean caravan terminus. It has many craft workers in pottery, weaving, leather, gold, and silver, is a busy market centre, especially for animals, and has a growing tobacco manufacture. Its communications include several short narrow-gauge railways to east, west, and south, and good motor roads to the other important coastal towns and to Ghadames. Next in importance is Benghazi (population

70,000), the poor roadstead of which was turned into a port now being improved to take large vessels. Besides its sponge- and tunny-fisheries and also its caravan trade, Benghazi serves the fertile Barka peninsula. Tobruk has a deep-water harbour but no hinterland; because of the coastal motor road built by the Italians, small harbours are decaying.

Tripoli is an important air junction on international routes and has regular air services to Benghazi and Sebha.

The total trade is small and is complicated by the financial and other aid now being received, though American aid largely takes the form of technical assistance and agricultural education. For trade purposes the three territories are treated separately (though Fezzan has no significant trade), and their trade figures include those of the mutual exchange of commodities. Staple exports are barley (in a good year), esparto, olive oil, and livestock. The first two go largely to the United Kingdom, olive oil to Italy, live sheep—chiefly from Cyrenaica—to Greece and Egypt. Fruit and vegetables are sent to Malta, while sponges go to the Dodecanese for processing. The United Kingdom and Egypt are the chief suppliers of imports, which are mainly manufactured goods and sugar; Egypt is well placed to serve Cyrenaica.

SPANISH SAHARA

This extends from latitude 27° 40' to Cape Blanco, and includes the colony of *Sekia el Hamra* (32,000 square miles) including the wadi of the same name, and the colony of *Rio de Oro* (73,000 square miles) lying south of latitude 26° N. These two mostly barren territories are administered from the Canary Islands, and are essentially Saharan with a scanty population. Villa Cisneros, the chief town of Rio de Oro, is on the opening—a good harbour—that bears this name. There is a number of oases and a population, largely nomadic, of Arabs, Berber, and negroid people; Europeans are few. Economic activity is slight, but it is thought that the territory possesses great mineral wealth. Fishermen from the Canary Islands and Brittany visit the coast.

THE ISLANDS OF NORTH-WEST AFRICA

Three groups of islands—all of volcanic origin—may be considered here. The Azores, rising out of a submarine ridge in mid-Atlantic, and the Madeiras belong to Portugal, the Canary Islands to Spain. The three groups lie respectively about latitude 38° N, 33° N., and 28° N. The Azores lie in the sub-tropical high-pressure area, but are sufficiently far north to be strongly affected by eastward-moving depressions in winter. The Madeiras and Canaries are in the trade-wind belt for the greater part of the year, but receive a certain rainfall from winter storms. The high relief is of marked assistance in increasing rainfall, this is least in the Canary Islands, which lie in the latitude of the Northern Sahara. The following table illustrates the principal climatic differences:

PLACE	HIGHEST MEAN MONTHLY TEMPERATURE	LOWEST MEAN MONTHLY TEMPERATURE	ANNUAL RANGE OF TEMPERATURE	RAINFALL IN INCHES
	$^{\circ}$ F	$^{\circ}$ F	$^{\circ}$ F	
Ponta Delgada (Azores)	71	57	14	39
Funchal (Madeira)	71	59	12	25.4
Las Palmas (Canaries)	71	60	11	16

It will be noted that as one progresses southward the annual range of temperature and the rainfall decrease, with a corresponding lengthening of the dry season. The flora and bird life have considerable scientific interest.

The Azores, uninhabited when discovered by the Portuguese, are administered as part of Portugal, and consist of three groups—the eastern group with São Miguel, the largest island, the middle group with Pico, which reaches 8500 feet, and the western group with Flores. The total area is 890 square miles, and the population, some 318,000, has shown a tendency to fluctuate in recent years, owing to emigration to America. Temperate cereals as well as maize and tobacco are cultivated, and considerable quantities of wine are produced. Many fruits are grown, including citrons

and pineapples, the latter under glass. There are considerable numbers of cattle, which use the hill pastures in summer, and butter and cheese are produced. The local fisheries are important. The lowlands are well populated, and terracing is a feature of the slopes.

Destructive earthquakes are occasionally experienced. There are numerous hot springs, some of which have medicinal value. Mineral waters are exported, and many invalids and tourists visit the islands. The tourist traffic seems capable of development.

São Miguel rises to 5600 feet, and contains the chief town, Ponta Delgada, sometimes a port of call of vessels on American routes. Fayal is an important centre of Atlantic cables, being linked with Brest, Lisbon, Halifax, and New York. The total trade is small, and largely passes through Lisbon.

The **Madeiras** are also administratively in Portugal. Besides the main island there are four small ones. Occasional earthquakes are experienced. The total area of 314 square miles carries about 250,000 inhabitants, giving a mean density of more than twice that of the Azores, but with a similar tendency to fluctuation. One of the smaller islands, Desertas, is uninhabited, the best known of the others is Porto Santo, the island first to be discovered (in 1418). There is little lowland, and Madeira rises in Pico Ruivo to 6100 feet. The tourist may descend the steep cobbled streets of Funchal in a wicker sledge. Well-wooded ravines and slopes remain, but the island has never recovered the forests that were set on fire shortly after the discovery, and which, it is said, blazed for seven years. The climate, which tends to dry heat in summer, is eminently suited to cereals and fruit. Careful terracing to conserve soil is an outstanding feature, and the water of the mountain streams is rigorously economized. The vine has been grown for five hundred years, and the wine export is specially important. Bananas and pineapples are included in the fruits produced, and so valuable are these cultivations that grain has to be imported, while sugar, once a leading crop, and introduced with the vine, still has some importance. Early vegetables for the European market are being increasingly produced. Many cattle are raised, and bullock transport is common. The *carro*, or bullock-sledge, is a quaint feature of Funchal. Many women are

engaged in embroidery and lace-making, and men in wicker-work and woodwork and the making of straw hats.

Not least among the assets of the island are the balmy winter climate, the picturesque ravines and mountain scenery, and the profusion of flower-gardens and orchards. Numerous invalids and tourists visit the islands, and much of the craft-work and import trade is connected with the large number of visitors. Funchal, with 90,000 inhabitants, is the only large town, situated on the slopes of a vast amphitheatre on the south side of Madeira, it is a tourist port of call on African and South American routes. Separate trade figures are not available.

The Canary Islands This is the largest of the three groups, and consists of seven islands, with a total area of 2800 square miles and a population of some 800,000. Tenerife and Grand Canary each have about 300,000 inhabitants. Hierro, Palma, and Gomera form a province with Tenerife, and Fuerteventura and Lanzarote form another with Grand Canary. They were vaguely known in ancient times as the "Fortunate Islands," and were originally inhabited by a race allied to the Berbers, now absorbed by the Spaniards; they became Spanish in 1479.

The snow-capped peak of Tenerife rises to 12,152 feet, this volcano is not extinct, though normally quiescent. The islands have little lowland, which is perhaps fortunate, as the rainfall at the lower elevations is very small. The west side has more rain than the east, but the lower areas—of largely decomposed basalt—bear only a scant vegetation, and streams from the mountains are essential to cultivation. At higher levels are growths of laurel and oak, vegetation ceasing at 10,000 feet. The African coast is only 60 miles from the most easterly islands, and a hot, parching wind from the Sahara is occasionally felt. A noteworthy feature of the Peak of Tenerife is that when the north-east trade-wind is blowing at the base the peak is often in the real anti-trade wind blowing as an upper wind from the south-west.

With irrigation bananas and dates flourish at the lower levels, higher up olives, vines, oranges, tobacco, and cereals are carefully cultivated, and immense crops of onions, tomatoes, and potatoes are produced. The onions are particularly grown for seed. The wine industry has declined, having been largely crippled by grape-

blight in the nineteenth century, and the red dye obtained from the cochineal insect (bred on cactus plants) is no longer very valuable since aniline dyes have been on the market, though there has been a slight revival because of its use in cosmetics. Bullock transport prevails, though camels are also used. The industries include embroidery, lace, and drawn-thread work, cigar- and cigarette-making (based upon tobacco from the Dutch East Indies and the United States), and fishing, which is of increasing importance. The fishing-grounds extend to Cape Blanco, and there is an export of dried fish to West Africa, as well as an export of tinned tunny, chiefly to Genoa. In addition, the tourist traffic is extensive.

Commercially it is possible to divide the Canaries into two groups, each with its *entrepôt*—Las Palmas, on Grand Canary, in the eastern group, and Santa Cruz, on Tenerife, in the western group. This division corresponds to the political status.

Grand Canary contains a remarkable extinct crater, the Caldera, a mile in diameter and 1000 feet deep; its highest point reaches 6000 feet. Las Palmas (population 150,000) is situated in the north-east, in arid surroundings, though adjacent to it are many irrigated farms. Its port is Puerto de la Luz, 3 miles away, protected by a sandy isthmus and a breakwater, it is an important port of call, accommodating large vessels and supplying them with coal and oil.

Tenerife, with its dominating mountains, possesses some magnificent scenery. Its capital, Santa Cruz (103,000 inhabitants), lies in the north-east, and has been made into a protected harbour. It supplies oil fuel and coal to many visiting ships, is increasingly visited as a health resort, and is the seat of administration of the group.

The trade is of considerable dimensions, though complete and separate figures are not available. Bananas, tomatoes, and potatoes are the chief exports, the first being the most important, while tomatoes reach the European market early in the year. Onion seed goes to the United States and the West Indies. The varied imports include coal and cotton goods from the United Kingdom, oil and iron and steel goods, largely from the United States, packing-wood from North-west Europe, grain, fertilizers,

seed potatoes, and many luxury goods for tourists. More than 12 million tons of shipping annually visit Las Palmas and Santa Cruz; the latter has an important oil-refinery and appears to be increasing its shipping trade relatively to that of Las Palmas.

As a cable-station, and in providing ports of call on South American and West and South African routes, the Canaries, with their active if poor population, stand considerably above the other two groups in importance. The prosperity of the people is mainly dependent upon the crop of fruit and early vegetables. Almost all the available cultivable land is utilized, and it is not surprising that there has been some emigration to Cuba and South America. The methods of intensive cultivation, involving terracing and irrigation, are very costly, and the land for bananas is among the most highly priced agricultural land in the world. Methods of both agriculture and fishing are mainly traditional (For Cape Verde Islands see Chapter VI, p. 241)

CHAPTER IV

EGYPT AND SUDAN

GENERAL CONSIDERATIONS

THE most important political and economic unit in the Nile basin is, and always has been, Egypt. This almost rainless land covers some 383,000 square miles, but the effective Egypt from the point of view of human settlement is an area of only 12,226 square miles, which is for the most part the area, including the delta, that can be irrigated by the Nile, though not all of this is as yet cultivated. This dependence of Egypt, and that of other areas to the south, upon the Nile water renders an understanding of the physical conditions of the Nile basin and of the régime of this remarkable river of the greatest importance for a proper appreciation of this part of Africa. From the point of view of historical geography Egypt, "the gift of the Nile," is remarkable in illustrating the physical conditions that favoured the development of early civilization. These conditions were.

(1) A regular supply of water, of course needing appropriate use, increased the value of temperatures that allowed the growth of crops all the year round, and a bountiful return for agricultural effort was thus assured. This provided a stimulus to progress in arts, and leisure, without which culture cannot flourish.

(2) Relative protection from invasion by people of a lower cultural development while the early civilization was growing was provided by the sea to the north, desert to the east and west, and to the south a middle and upper course of the Nile so obstructed that it was not an easy line of advance. Even to-day the surface communications of the Upper Nile lands are not northward, but eastward by rail and motor-road through Kenya Colony.

In recent years, and especially since the freeing of the Sudan from the tyranny of Mahdism, great attention has been given to the development of this region, more particularly in connexion with the possibilities of cotton production. The relatively

inaccessible parts of the Nile basin to-day are, firstly, the Bahr el Ghazal region, where a transition from grass-land to tropical forest conditions takes place, and, secondly, the high basaltic plateau of Ethiopia, which is the source of some of the more important of the Nile tributaries.

Physical Conditions of the Nile Basin

The Nile, some 3500 miles in length from Lake Victoria to the Mediterranean, or 4150 miles if the Kagera be included, drains an area of 1,100,000 square miles, and then flows for hundreds of miles through a tributary-less desert. Lake Victoria, on the equator in the northern part of the Lake Plateau, receives the Kagera and minor streams. It is at a height of 3700 feet. A rapid descent, including the Owen Falls, brings the Victoria Nile to Lake Kioga, and an even more abrupt descent, including the Murchison Falls, carries it to the north of Lake Albert, where comes in water from the western branch of the Great Rift Valley system, at the head of which lies Lake Albert, draining Lake Edward and Ruwenzori by the Semliki river. The combined waters form the Albert Nile, or Bahr el Jebel. The valley widens towards the north, and the steep banks of the gorge at Dufile (= "defile") are exceptional. At Gondokoro, at a height of about 1500 feet, the river commences a meandering and swampy passage through Sudan. At Lake No the Bahr el Ghazal with its swamps joins the main stream, having combined the drainage of the Bahr el Arab and numerous other streams that discharge water from the wet plateau area separating the Nile basin from that of the Congo.

It is along the Bahr el Jebel and the Bahr el Ghazal that the well-known accumulations of sudd (= "block") develop. In marshes, lagoons, and backwaters, papyrus, reeds, and other water-loving plants flourish. This vegetation encroaches upon the river itself, and often completely hides the channel. In such circumstances navigation is maintained only by clearing it away, a tedious operation involving the finding of the river-bed, the burning off of the top vegetation, and the cutting of the sudd into blocks, which are forcibly removed with the assistance of a steamer. In recent years the regular use of the main stream has hindered, if not prevented, the formation of blocks in it. It seems

probable that the whole sudd region, extending eastwards into Ethiopia, was once an inland lake which has been filled with alluvium by the annual flood of centuries. In the Bahr el Ghazal region are vast areas of alluvial flats which are alternately open grass-land in the dry season and under shallow water in the wet.



FIG. 60. DINKA VILLAGE IN THE SUDD REGION

The rank, water-loving vegetation that often becomes detached in great masses in flood-time is well seen

Sudan Government

Below Lake No there are no significant left-bank tributaries, but on the right bank enter the Sobat, Blue Nile, and Atbara, tributaries of vital importance to the White Nile. They come from the Abyssinian plateau, a plateau mainly over 6000 feet, and with considerable areas over 10,000 feet, and consisting of enormous lava-flows superimposed upon Archæan rocks. The Blue Nile, rising in Lake Tana, is the most important of these tributaries, and between its mouth and that of the Atbara occurs the first (called the sixth) cataract; the "first" or lowest cataract is just above Aswan. The river in this stretch containing the cataracts is passing through a belt of Nubian sandstone, the rapids themselves being due to intrusive masses of granite, and the amount of alluvial land available for cultivation is very limited. Below

Atbara no permanent stream reaches the Nile, although half its course is still to run.

Some way below Aswan the Nile enters a narrow and possibly tectonic trough in the Libyan limestone—a trough filled with Nile silt—and within the limits of the cliff-like walls, to the eastern one of which the river tends to cling, is the cultivated strip known as Upper Egypt. This widens out below Cairo into the delta, the greater part of which is cultivated and has been so intensively canalized for irrigation purposes that of seven original mouths only two (Damietta and Rosetta) may be said to remain. The delta is known as Lower Egypt.

An important part of cultivated Egypt is the depression of the Fayum oasis, which receives water by canal from the Nile.

Climate. If the climatic figures relating to places in the Nile basin given in the table on pp. 46 and 47 are studied they will give a good idea of the differences that obtain. A few supplementary figures are appended

PLACE	MEAN TEMPERATURE		RAINFALL IN INCHES
	HOTTEST MONTH	COOLEST MONTH	
Berber	° F 93.5	° F 67.5	None
Addis Ababa	62	56	48.7 (mainly summer)
El Obeid	86	67.5	14 (summer)
Wadelai	82	76	43 (minimum, January–February)

The influence of latitude is plainly brought out when all the relevant figures are compared. The following points should be noted in addition:

(1) In the plateau regions and the drier areas there is usually a considerable daily range of temperature.

(2) The annual range of temperature varies chiefly with the character of the rainfall, the largest being experienced in the driest regions.

(3) In view of the fact that temperatures everywhere permit of cultivation all the year round it is desirable to pay most attention to the rainfall.

(4) Kisumu is an example of a place having rain all the year round, with a double maximum

(5) The rainfall of the summer-rain belt is associated with the movement of the inter-tropical front and is monsoonal in character. Between about 5° N. and 18° N northerly winds predominate during the winter months, but in the summer months southerly and south-westerly winds prevail. The rainfall is largely of the kind associated with thunderstorms. The Abyssinian Highlands naturally receive a heavy rainfall.

(6) As in all regions where the rain comes chiefly in one season, there are marked differences in the amount from year to year, differences which may mean prosperity one year and scarcity another. The following table illustrates this

PLACE	TOTAL RAINFALL IN INCHES—MAY TO OCTOBER INCLUSIVE	
	1923	1924
Kosti	17.5	12
Kassala	18.5	11.5
Khartum	13.5	2.75
El Fasher (Dar Fur)	12	20.5

(7) It is only to be expected that the Sudan rainfall should decrease northward towards the Libyan and Nubian Deserts, but it should be noted that large areas have sufficient rainfall for some form of cultivation. In the desert regions the occasional storms have no appreciable effect.

(8) Egypt is broadly in the dry belt, but a feature of its climate in the north is the hot and dusty khamsin, which, blowing from the south or south-east, chiefly in spring and early summer, often dries up the leaves of growing plants. On the average it blows at Cairo on 11 days in the year. The rainfall of Cairo (1") and of Alexandria (7½") shows that the delta is on the fringe of the winter rainfall of the Mediterranean basin.

The Régime of the Nile

In the early part of the year the rainfall of the Nile basin is at a minimum, and more than half the supply of water to the Lower

Nile comes from the Lake Plateau. For several reasons the discharge of the Nile at Lake No varies only slightly during the year. The loss of water in the upper part of the Nile basin is so great that only a tiny fraction of the rainfall of the basin above Lake No is discharged at that point. Nevertheless, there is an appreciable summer flood past Gondokoro, although it has little economic significance. Lower down the Bahr el Jebel and along the Bahr el Ghazal, however, the accumulations of sudd spread the water out in shallow swamps, and this mass of vegetation assists in producing a tremendous loss of water by evaporation and transpiration, the result of which is the very small discharge at Lake No, although this discharge is the chief winter supply of water to the lower river.

The Sobat brings down monsoon rain from Ethiopia, much of which is from the Atlantic and little from the Indian Ocean, there is but little winter snow to supplement the rainfall. Its discharge, beginning in May, causes a rise of 10-12 feet between its junction with the White Nile and Khartum.

The Blue Nile discharge is the most important element in the Nile flood. In August, September, and October it provides over two-thirds of the water of the Nile. It causes the Nile at Khartum to rise sharply at the end of May and to reach its maximum early in September, after which the fall is rapid. The rise at this point averages 22 feet, and the White Nile water is ponded up by a flood discharge that at its maximum is some fifteen times as great as that of the main river itself. This damming-up prevents the White Nile from having more than a slight effect in producing the flood lower down, but at the same time helps to retard the fall in the Nile below Khar um after the Blue Nile has passed its maximum. Yet when the Nile is lowest, in April and May, 80 per cent. of its water is from the White Nile. The Blue Nile also brings down the bulk of the silt that is deposited in Egypt, for the Atbara lower down gives only a minor contribution and its discharge is a purely summer one, whereas the Blue Nile is able to maintain a small winter flow, being regulated by Lake Tana at its source.

At Wadi Halfa the river continues falling until the middle of June, as it takes time for the flood-water to pass down the river.

It rises rapidly until the middle of September, and then falls equally rapidly, although there is still a considerable flow even at the end of the year. The Cairo maximum occurs in October. All through its middle and lower track the Nile suffers great loss

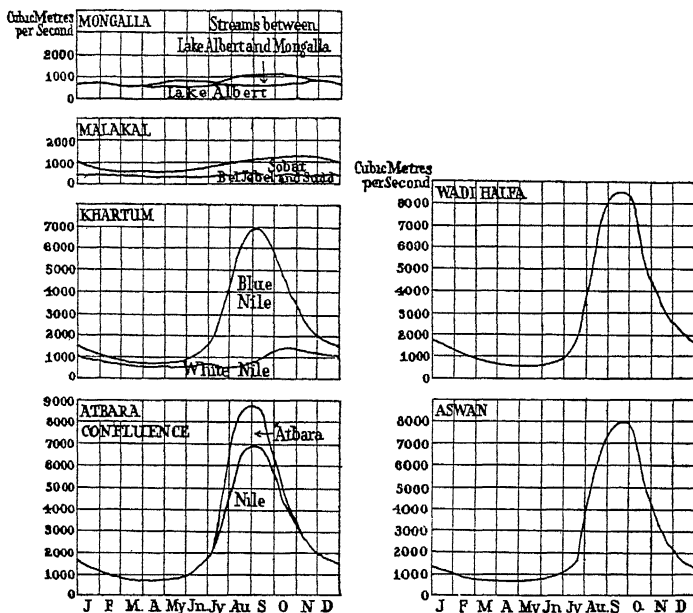


FIG. 61. AVERAGE DISCHARGE OF THE NILE, 1912-26

The maximum flood arrives at Aswan nearly a month later than it reaches the Atbara confluence, it is further delayed in the lower reaches, so that the maximum flood at Cairo is in October. More recent gauge-readings have only slightly modified these curves

After Dr H E Hurst

by seepage, evaporation, and irrigation, with the result that the amount of water it sends into the Mediterranean Sea, almost entirely by the Rosetta and Damietta mouths, is very small, indeed, when the Nile is at its lowest these mouths have to be artificially dammed to prevent an inflow from the sea.

Vegetation. Desert, grass-land, and forest are all represented in the Nile lands. Southward from the Egyptian frontier, the

desert stretches well into Sudan, after which the vegetation cover increases in luxuriance, with a corresponding increase in the animal life. Scanty grass and thornbushes lead on to richer grass-land to the south, with scattered trees and thickets, the trees including the baobab, the enormous hollow trunk of which is commonly used for storing water. Varieties of stunted acacia, producing gum, are found in the drier areas; these have great economic importance. The change from grass-land to more

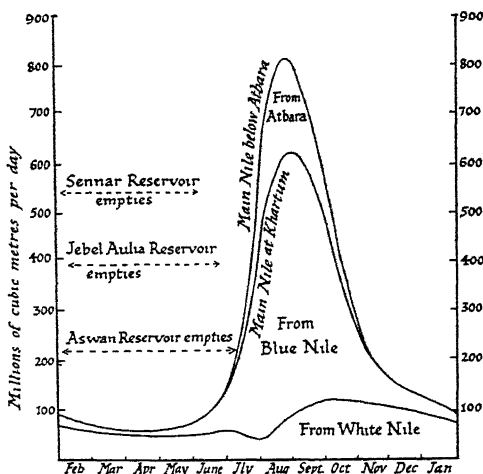


FIG 62. THE DISCHARGE OF THE NILE AT KHARTOUM AND AT THE ATBARA CONFLUENCE

Note the 'release' of White Nile water as the Blue Nile flood subsides

luxuriant savanna or park-land conditions is indicated by a change in the huts of the natives, the mud dwellings in the drier parts giving way to thatched huts in the wetter. The camel and date-palm are typical of the desert belt; farther south ostriches, cattle, and big game suggest the increasing luxuriance of the vegetation. Opportunities of cultivation without the assistance of irrigation increase southward, though it cannot be said that Sudan is well cultivated at present. Elephants in Southern Sudan and Uganda suggest the presence of forest conditions, and though the

Lake Plateau is, broadly speaking, a savanna region, there is a good deal of forest. Bananas and ground-nuts are typical of this region.

Beyond the swamps of the Bahr el Ghazal the rim of the Nile drainage area merges into the equatorial forests of the Congo, where rubber and ivory are typical products. The Abyssinian Highlands show the influence of altitude, the lower valleys are well forested, and are the home of the coffee-plant, suggesting tropical conditions, temperate forest, much of it of a coniferous character, and temperate grass-land cover large parts of the plateau.

Insect-borne diseases affecting both man and beast are an important economic feature. Malaria occurs from Lake Victoria to the Mediterranean. In the swampy districts of Uganda sleeping sickness has been a terrible scourge; it is not so prevalent as formerly. The ravages of the tsetse fly, in the areas below about 4000 feet, particularly affect the keeping of domestic animals in the moister southern regions, so



FIG. 63. GUM-COLLECTING IN KORDOFAN

Note the Sudanese Negro, typically tall, slim, and black
Sudan Government

that, even with modern transport developments, human portorage is still to some extent necessary. The infected tsetse fly has seriously affected the number of cattle in Uganda and Southern Sudan, though much is now done to control the spread of the pest and to free infested areas from it. The locust may be more than a nuisance to the agriculturist of the grass-lands, and the

ravages of the termite ant in the moister south seriously militate against the use of wood.

People. The peoples of the Nile lands show considerable variety, and include even primitive pygmy tribes along the Semliki river and the Congo divide. Broadly speaking, the cultivators of Egypt (fellahin) are of Hamitic origin and the Bedouin Arabs are Semitic, but there has been much mixture of races. Although the Sudan is "the land of the Negroes," the tribes of the northern part are largely Arab, and in the middle zone they show considerable Hamitic admixture, while the Bantu Negro of part of Uganda also has Hamitic blood—*e g.*, the Baganda, one of the most advanced of native tribes. The Negro tribes proper, while they show various stages of culture, show great uniformity of physical characteristics—*e g.*, in being tall and slim and possessing a thick mop of black hair. The Hamitic people of Egypt are careful cultivators; the Negro peoples are still very largely primitive gardeners and cattle-keepers. The Semitic tribes are pastoralists, and were for long a menace to the cultivators of the Lower Nile. Modern economic developments have, however, tended to make them more sedentary.

Irrigation and Agriculture

Egypt is "the gift of the Nile," and irrigation of a sort has been practised here for at least 7000 years. It depended of old upon the supply of flood-water, and was distinctly limited in scope. Modern engineering has greatly added to the economic development of both Egypt and Sudan, and further projects will much extend this.

Basin Irrigation. The traditional irrigation of Egypt is the 'basin' or 'flood' method, with one flooding a year, and is responsible for the characteristic building of villages on mounds which become islands during the flood period. The early summer in Egypt is the time of low Nile, and the latter part, reaching into autumn, is high Nile. Summer, with the ground baked or flooded, was a time of little cultivation, but the long strips of land stretching away from the Nile bank which formed and still form the ordinary holdings were carefully divided into 'basins'—pieces of land bordered by mud walls—into which the flood-water passed. As

the basins near the banks filled the water was passed into basins farther from the river, and, if necessary, more remote basins were filled by means of the shaduf, the sakiyeh, and the Archimedes' screw, simple appliances also used during the time of low Nile, though to-day modern pumps are often to be found. After lying on the land for some fifty days the water was allowed to drain off and the seed—wheat, barley, flax—was sown, the moisture, combined with the warmth of winter, being enough to raise the crop. The yield was largely determined by the area reached by the flood-water, itself dependent in amount on the rise of the river. The average rise at Cairo is 25 feet; the minimum is about 21 feet, a height which seriously limited the irrigated area; a rise of more than the normal, on the other hand, may do great damage to embankments. The basins have a perfectly graded surface from the silt that has been deposited over the centuries. Silt reaches Egypt at the estimated rate of 100 million tons annually, each flood depositing perhaps a millimetre of fresh soil.

Basin irrigation from the flood water, supplemented by the use of lifted water from river, canal, pool, or well, prevailed in Egypt until the early years of the nineteenth century, since when it has gradually declined. To-day it has disappeared from the delta and is confined to about 700,000 acres in Upper Egypt, where, in fact, many basins are now irrigated with pumped well-water, which is in effect perennial irrigation. Basin irrigation of the traditional character obviously means that only 'winter' crops could be produced in any quantity. The modern method of perennial irrigation has increased and fixed the area that can be cultivated, and has had the enormously important effect of making possible the production of great summer crops in addition to the winter crops.

Perennial Irrigation. Modern irrigation schemes were commenced without the more complete knowledge of the hydrology of the Nile that has since been forthcoming as the result of careful recording and research, and the need for further and properly correlated schemes is urgent. Egypt contains some large cities, and the urban population is increasing at a greater rate than the rural. Moreover, the demand for foodstuffs is augmented by the natural increase of population, which was 20 per cent. between

the 1937 and 1947 censuses, a rate still being maintained. To conserve more water, both for the purpose of extending the cultivated land and to provide for existing needs when the flood falls below normal, is therefore imperative. Great dams like that at Aswan are very expensive, and must be carefully regulated to prevent infilling with silt. The Blue Nile is the great contributor of silt, its flood, when damming up the White Nile, is allowed to pass the dam, and the reservoir is filled from the relatively clear water of the White Nile as its contribution passes along the river after the Blue Nile flood has begun to subside. The dam is supplied with upper and lower sluices, the latter being kept open during the silt-carrying floods.

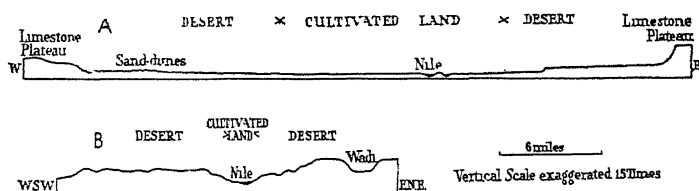


FIG 64 SECTIONS ACROSS THE NILE VALLEY

- A 10 miles south of Maghagha This section shows the maximum width of the cultivable strip of Upper Egypt
 B 10 miles south of Edfu

After Sir Henry Lyons' "Cadastral Survey of Egypt"

The most famous of the existing works is the Aswan dam, $1\frac{1}{4}$ miles long, opened in 1903. Its height was increased in 1912, and again in 1933, so that the level of the river when the reservoir is full is raised as far up as the Second Cataract, making a storage of 5000 million tons of water. The drop from the top of the dam to the water below is 123 feet, and the difficult task of incorporating a hydro-electric power station, which will be able to operate for only eight months of the year, has been completed.

The Aswan dam was built to store water for use during low Nile. Without supplementary works it would be of limited value. Indeed, the original Delta Barrage and certain important canals had been constructed before the dam was proposed. To-day there are a number of barrages the object of which is to raise the level of the river to allow water to move by gravity along main canals

with high banks that carry the irrigation water. The Delta Barrage is essentially two—one across each of the Damietta and Rosetta branches just after the branching of the delta, these are the Mohammed Ali barrages. Three canals carry irrigation water respectively to the western, central, and eastern parts of the delta, and other delta works include the Zifta barrage on the Damietta branch and the Edfina barrage near the mouth of the Rosetta branch. The last replaces the earth dam built annually to keep out the sea during the period of low Nile; one is contemplated also for the Damietta branch. For half the year the sluices on all the barrages of the delta are closed, and all the available water is used for irrigation, none reaching the sea. (The Ismailia Canal, carrying river water to the Suez Canal Zone, also takes off above the Delta Barrage.) Other regulating dams feeding main canals have been built at Esna (Isna), Nagh Hamadi, and Asyut, the last regulates the supply of water to the Fayum.

An important contribution to Egypt's perennial irrigation is made by the Jebel Aulia dam, completed by Egypt in agreement with Sudan in 1937. It lies about 30 miles south of Khartum on the White Nile, and its storage makes possible the irrigation of about half a million acres.

The Sennar dam at Makwar on the Blue Nile was finished in 1925. It is designed to irrigate the Gezira plain, which lies in the angle made by the White and Blue Niles. At present about $1\frac{1}{2}$ million acres are canalized for irrigation. There has been considerable expansion covered by a regulating agreement with Egypt, for, clearly, unregulated control of the Blue Nile must have serious effects upon cultivation in Egypt.

Perennial irrigation not only extends the area under crops but allows of all-the-year-round cultivation, and, as much land raises two or three crops a year, the acreage annually cropped is much greater than the irrigated area. Irrigation, however, raises serious problems, the chief of which are connected with drainage. In the early years of this century there was an alarming drop in the yield of cotton per acre, which declined from an average of 5.6 cantars of unginned cotton (a cantar of unginned cotton is 315 lb.) for the period 1895–99 to 3.7 cantars for the period 1915–19. In 1920 it dropped to 3.4 cantars.

Two chief reasons seem to have accounted for this decrease: (1) that the relatively stagnant irrigation water brings additional salt to the soil; (2) that the water-table is so near the surface in

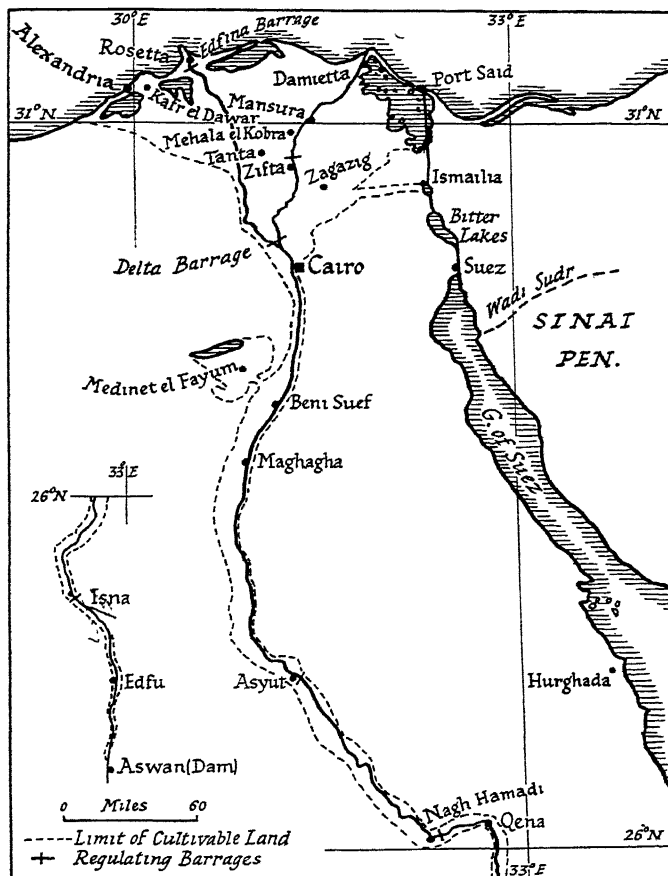


FIG. 65. THE LOWER NILE

The Nile clings to the right bank. A good deal of swamp remains in the Mediterranean littoral.

Limit of cultivable land based on a map in Sir Henry Lyons' "Cadastral Survey of Egypt"

the irrigated land that cotton, a very deep rooted plant, has its root-development checked by not having sufficient room before the root-growth reaches the water-table.

This serious situation was met by improved drainage, which is still receiving much attention. The Nile acts as a natural drain for subsoil water for the basins covered by the flood, but under perennial irrigation the subsoil water with its accumulated salts was found to rise until it reached the root level of the cotton plants. Such stagnant water can only be removed by seepage into drains (ditches), and the level of the water-table is determined by the depth of the drains. A proper system of gravity drains has now been developed. Open drains quickly get choked with weeds—main drains, however, must be open—and can only be maintained at heavy cost. Covered drains are becoming general wherever they can be usefully employed, and their depth, like that of the main drains, is carefully adjusted to the level and extent of the areas served. A general deepening of drains has taken place, and the average yield of cotton per acre has in recent years reached 5 cantars. It should be noted that drains in the delta are emptied by pumping.

Another effect of perennial irrigation is to decrease the supply of silt to the basins owing to a certain amount of deposition behind the barriers and to the general checking of the flow of the flood-water. The importance of this is disputed, some investigators incline to the view that the fertilizing qualities of the silt, which is chiefly derived from the volcanic Abyssinian tableland, are not by any means so great as is generally assumed. It is, however, certain that perennial irrigation has necessitated the widespread use of fertilizers.

The Extension of Irrigation. Some 6 million acres are at present perennially irrigated in Egypt. It is thought that there remain about $1\frac{1}{2}$ million acres that can be so irrigated, located in delta marshes that await reclamation, and with the assistance of pumping in the desert margins and on the lower desert slopes, particularly in the Tahrir province west of the Rosetta branch of the Nile. In the Gezira, the present $1\frac{1}{2}$ million acres could be increased. There is a pressing need for further water so that the maximum amount of land may be brought under irrigation.

The problems involved are clearly both technical and political. Egypt is the country chiefly needing Nile water, but further development depends on agreement with other countries—chiefly Sudan, Uganda, and Ethiopia. An agreement with Sudan in 1929 has been replaced by a much more comprehensive one signed in 1959, under which important projects are planned which will enable both Egypt and Sudan greatly to increase their irrigated areas.

The hydrology of the Nile—its normal flow and variations, the contributions of its tributaries, the losses incurred along its course—has been studied in great detail, and new developments are directed to the related problems of storing more water and of regulating the flow, particularly to ensure an adequate supply when the Nile flood is below normal. The lakes that feed the river and its tributaries and the sudd region where so much water is lost have received special attention. Regarding storage, a distinction is made

between storage for annual use (as with Aswan) and storage for long-term use (sometimes called 'century storage'). The following list sets out schemes that have been proposed

(1) Raising the level of Lake Victoria. When Uganda decided to harness the power of the Owen Falls Egypt secured an

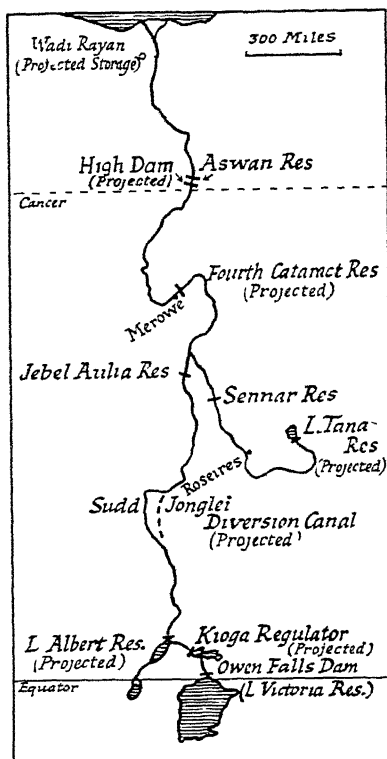


FIG. 66. CONTROL OF THE NILE—
LOCATION OF EXISTING AND PROPOSED SCHEMES

agreement whereby the necessary dam would be built one metre higher than was planned for the power scheme, Egypt meeting the additional costs. This dam makes Lake Victoria the largest reservoir in the world. The object of this storage is to supplement the Nile flow in bad years.

(2) A regulating barrage at the exit of Lake Kioga to allow water sent from the Victoria reservoir to pass immediately downstream.

(3) A regulating barrage at the exit of Lake Albert to control the flow of the whole of the water of the Upper Nile.

(4) A dam at the outlet of Lake Tana to provide for further irrigation in the Gezira and a reserve for use in Egypt in times of low flood.

(5) The Jonglei diversion canal to by-pass the swamps of the sudd area and reduce by about one-quarter the present loss of water in that region.

(6) A dam at the Fourth Cataract above Merowe, mainly for flood control in Egypt but also for some storage.

(7) The use of a large depression, the Wadi Rayan, south of the Fayum, has been suggested partly for flood control and partly for storage.

(8) A High Dam at Aswan. The projects already listed represent a programme the completion of which could not be foreseen. Egypt's urgent need for more water has led her to embark on a scheme the purpose of which is, in effect, the total utilization of the Nile waters. Four miles upstream from the present dam work has begun on the High Dam (the Sadd el Ali) which will be a 3-mile-long dyke of sand, gravel, and stone rising 225 feet and creating a lake 300 miles long with a level 200 feet above that of the present dam when full and with 17 times its storage capacity. Ancient monuments, villages, and towns—chief of which is Wadi Halfa, in Sudan—will be submerged; the Second Cataract will disappear under a lake covering 1150 square miles, the waters of which will be diverted through tunnels on both banks; there will be no through navigation. While some 10 per cent of the water will be lost through evaporation, ample will remain for the conversion of the remaining basin irrigation area to the perennial type and for an increase of the present irrigated area by nearly

one-half Associated with the scheme will be two underground power-stations of enormous capacity

Agreement between Egypt and the Sudan has been reached upon (i) the Merowe Dam, (ii) the heightening of the Sennar Dam, (iii) a new dam at Roseires on the Blue Nile in Sudan (preliminary work has been done on this), (iv) compensation for the displacement of the people of the Wadi Halfa area, whom the Sudan Government proposes to resettle on land to be irrigated from a dam planned on the Atbara

THE REPUBLIC OF EGYPT (MISR)

The British protectorate over Egypt which existed during the First World War was terminated early in 1922, and Egypt then became a sovereign state. The Anglo-Egyptian Treaty of Alliance of 1936 recognized the special British interest in the defence of the Suez Canal, and confirmed the operation of the Condominium Agreements of 1899 governing the administration of Sudan. Following the Second World War, demands for "the unity of the Nile valley" and for the termination of the British occupation of the Suez Canal Zone grew in intensity, subsequently the king was deposed, Egypt became a republic in 1953, and the evacuation of the Canal Zone by British forces was agreed in 1954. In 1956, Egypt nationalized the Canal and in that year the occupation came to an end.

The country includes the Sinai peninsula and extends southward to parallel 22° N, thus covering about 383,000 square miles, mostly desert. Lower Egypt (the delta) and Upper Egypt (the Nile valley and the Fayum), with other 'habitable land,' cover a total of only 13,400 square miles—an area little more than twice the size of Yorkshire. Of this area about a fifth is water or marsh. Much of the latter is reclaimable. The population is some 25 millions (19,092,389 at the 1947 census) as against 12,750,000 in 1917, giving the enormous density on the settled land surface of about 1800 to the square mile.¹ Of the total 62 per cent comprise the fellahin, many of whom are labourers working for the farmers;

¹ This figure would be substantially reduced to perhaps 1000 to the square mile if the population of the larger towns were excluded

such labourers have in recent years been migrating in increasing numbers to the towns. There are a number of Europeans in the country, chiefly Greeks and Italians, and some 50,000 nomadic Bedoun Arabs are found in the great area of Egypt beyond the tilled land

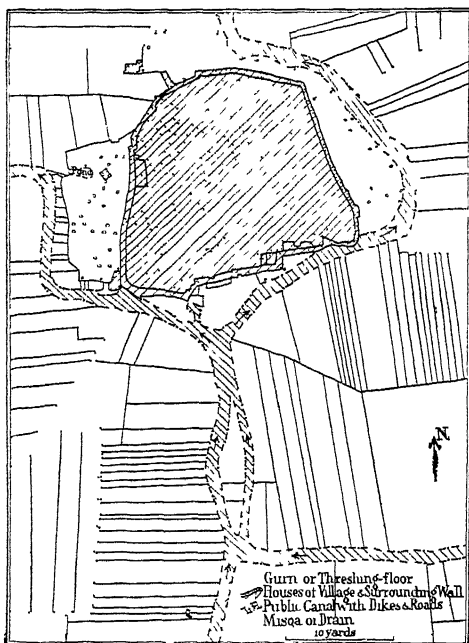


FIG. 67. SMALL VILLAGE OF LOWER EGYPT

This shows the size and arrangement of the holdings. The holdings are normally very small, but each has access to water. Note that the roads run along the dykes of the main irrigation canal.

After Sir Henry Lyons' "Cadastral Survey of Egypt"

It is significant of the minute division of the land that in 1950 over 70 per cent. of the land holdings were under 1 acre and over 22 per cent. were under 5 acres. The existence of very large estates was shown by the fact that one-fifth of the land was in holdings of over 200 acres and in the possession of only 0.1 per cent. of the

strip, disputed with Israel. Irrigated orange groves are a feature of this small area.

Ground Water in the Nile Valley Irrigation methods in general have already been described, but there are some supplementary details of importance. Between Aswan and the Nagh Hamadi barrage irrigation is on the basin system, except for some watering by pumps. Perennial irrigation begins below this barrage, though basins are still found along the valley to within a short distance of the delta, where irrigation is exclusively of the perennial type.

Well-water makes a significant contribution to irrigation in Upper Egypt. This is related to what has been called the Nile's 'underground tributary' which arises in the following way. The deep trench of the Nile valley is filled with deposited material. The upper layers are of clay, below are sand and gravel, which are water-bearing. The bed of the Nile is below the base of the clay, and the river feeds the water-bearing beds except for a reverse movement when the Nile is low. But there is also a continuous gravity flow seaward, along the water-bearing beds, which reaches the western distributary of the river. These beds constitute an enormous aquifer, and the blocking of this 'tributary' at its mouth has been suggested, with the object of forcing it to discharge farther upstream. At present some 400,000 acres are irrigated by water pumped from it, half of this being in the upper part of the valley—above Nagh Hamadi—where there is still good land, perhaps 250,000 acres, awaiting irrigation.

Agriculture is necessarily the dominant occupation, as it has been from the earliest times. Careful, intensive husbandry with simple methods and implements is still general, but mechanization has grown significantly in recent years on the larger estates. The wooden ox-drawn plough is still in common use. Rotation of crops is practised, but the temptation of a high price for cotton may lead to its suspension, or at least modification—for example, a two-year instead of a three-year rotation. The fellah, also, may be too lavish in watering his crops now that perennial irrigation guarantees a supply, or may grow cotton on inferior ground. Sun-dried bricks are the ordinary building material, and in the delta especially the fellahin are crowded into small villages, thus

economizing valuable land. In times of high Nile they must be prepared to protect and mend the walls and embankments. The importation of manures (chiefly Chilean nitrates) is much less than formerly as Egypt now manufactures a good deal of nitrate fertilizer as well as superphosphate. The need for fertilizer arises from the intensive use of the land which carries up to three crops a year. The Government does much to foster scientific farming. It pays particular attention to cotton, controls the distribution of seed, carries on research for the breeding of improved and new strains, and organizes campaigns against pests. It encourages the diversification of crops—owing to the economic danger of dependence upon one main commercial crop—and the cultivation of fruit and vegetables for the European market. The farming includes the rearing of oxen, buffalo (for ploughing, etc.), sheep, goats, donkeys, mules, and camels, while poultry have great importance (large quantities of eggs are exported). The raising of livestock depends mainly not upon pasture in the European sense but upon the fodder crop barseem (Egyptian clover), tethered cattle are grazed on it, and so quickly does it grow that five or six cuttings can be made from it during the few months it is on the ground.

A threefold division of Egypt's crops can conveniently be made. In Upper Egypt autumn crops, chiefly maize, dura (millet), rice, and vegetables such as onions and tomatoes, are grown on ground above the flood-level while the Nile is still high. In winter, although the northerly winds can be quite cool, there is quite enough warmth to grow wheat, barley, pulses, clover, and flax (a much-declined crop) upon the ground from which the flood has receded. Summer crops requiring sub-tropical or tropical heat and perennial irrigation, especially cotton, are chiefly produced in the delta. This crop—Egypt's great cash crop—normally covers nearly one-third of the cultivated area, and some two-thirds of the people are dependent on it. Another important delta crop is rice, grown chiefly in the northern part; production has expanded so much that sometimes there is a substantial surplus for export. Sugar-cane cultivation, confined to Upper Egypt, does not always meet the country's requirements. Large quantities of dates are grown both by the Nile and at the oases, and there has latterly been a

steady increase in the production of fruits, including bananas, grapes, figs, mangoes, olives, and citrus

Cotton, wheat, and maize occupy between them the bulk of the cultivated acreage of Egypt, and so dominating is cotton that considerable quantities of foodstuffs (chiefly wheat, flour, and sugar) have to be imported. For this reason the Egyptian Government endeavours to restrict the area under cotton.

The Fayum oasis may be regarded as an outlying part of the Egyptian irrigated lands. It lies below sea-level, the ancient Bahr Yusuf, now a branch of the Ibrahimia Canal that serves Middle Egypt, brings water to it. It is very carefully cultivated. In the Libyan Desert there are several important oases—Siwa, Dakhla, Kharga—situated in depressions where underground water is reached. The food-crops of Egypt proper are also found here, and light railways to the main highway permit of the export of dates.

Cotton. Commercial cultivation of cotton began rather more than a hundred years ago, and received a considerable fillip during the American Civil War. Egyptian cotton generally is of fine quality—long staple, fine lustre, silky, and strong—and second only to sea-island cotton. Moreover, the average yield per acre (about 450 lb. of ginned cotton) is nearly twice that of United States rain-grown cotton. In Egypt many varieties have been, and are still, grown. For a long time Sakellariadis (Sakel), cultivated chiefly in the delta, was outstanding, but its fine quality seems to have deteriorated, and in recent years it has fallen out of favour though it remains the basis of new varieties, two others—long-staple Karnak and long-medium staple Giza 30—have attained prominence. Upper Egypt principally grows a variety—Ashmouni, of medium staple—yielding a brownish-coloured fibre. Research into breeding new varieties is carried on at an experimental station at Giza. A pest known as the pink boll-worm first appeared in 1912; it annually destroys a substantial percentage of the crop.

Mineral Resources. Egypt's mineral wealth is limited. There is much building stone, phosphates are worked at Kosseir and other places, about 450,000 tons being produced annually, and in the Sinai peninsula a little manganese ore is mined. There are

small oilfields on each side of the Gulf of Suez, from which Egypt gets about half her requirements, some development is in progress on the Sinai side, where, south of the Wadi Sudr, it is thought there are considerable reserves

Industries and Towns Many arts and crafts are indigenous to Egypt, modern industry has been growing significantly in recent years, especially in and around the larger towns. A good deal of spinning and weaving of cotton is carried on—about one-fifth of the cotton production is now manufactured locally and there is a little export of yarn—while there is some manufacture of other textiles—wool, silk, and flax. Imported and local sugar is refined. This and cigarette-making, using imported tobacco from Greece, Bulgaria, and Turkey, are two considerable industries. Cotton-seed oil and cake and soap are manufactured; sewage is turned into manure; fertilizers, cement and brick-making have importance. It is noteworthy that the bulk of the railway rolling-stock is made in State railway-workshops. Alexandria and Port Said do some shipbuilding and ship-repairs. A point of increasing importance to Egypt is the tourist traffic; large numbers of tourists visit the country, not only because of its extraordinary historical and archaeological interest, but on account of its excellent winter climate.

Rapid industrialization is now being stimulated. Textile industries, oil refining, cement and fertilizer manufacture are all expanding; a modern iron and steel plant is encouraging engineering, and light industry (*e g*, pharmaceutical goods, refrigerators) is developing.

Two towns deserve special analysis. The shape of cultivated Egypt allows of only one great market and Government centre—Cairo, and the delta allows only one great port—Alexandria.

Cairo (population 2,100,000) stands where the narrow strip of Upper Egypt meets the broad delta, in an obvious position not only for a centre of trade, but also for the government of the two areas. It is built on a spur of the Mokattam Hills, at a point where the Nile passes at the foot, and both water and land roads between delta and valley must pass it. Here, too, was the lowest crossing-place of the Nile. Caravan routes from Asia converged upon it, and, of course, to-day its nodality is emphasized by roads, railways, and air routes. It is essentially a market, commercial, and capital

city, with a number of well-established craft industries, as well as factories and workshops dealing with textiles, railway engineering, food processing, soap, paper, and cigarettes. Embabah is a new industrial suburb, while Bulak is an older industrial section. About 8 miles south of the city is Helwan, with cement works, here, a large iron and steel project, using iron ore from Aswan and imported fuel, is in production.

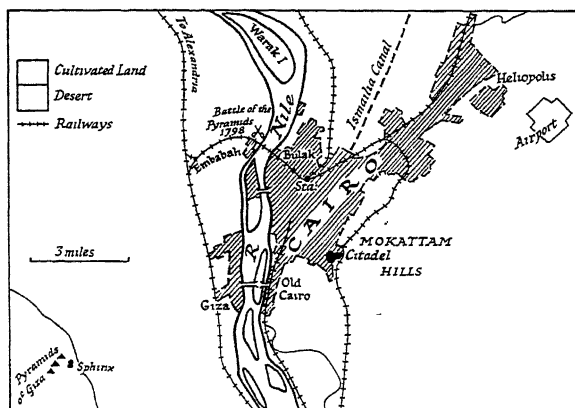


FIG. 68. THE POSITION OF CAIRO

Delta routes for Upper Egypt converge on Cairo, situated on a spur of the Mokattam Hills

Alexandria (1,000,000 inhabitants) is the site from which the ancient Greeks for a time controlled Egypt and tapped the Far Eastern trade. A delta is not usually convenient for shipping, and in this case the eastern part is less useful than the western, because currents from west to east sweep the silt eastward. A long island strip off the western part of the delta, with salt marsh on the landward side, provided Alexander the Great with a base accessible at once from the sea and from the delta, and therefore from the valley. This island is now joined to the mainland, and to deal with modern shipping an artificial harbour has been constructed. Railways link it with all parts of the delta and a ship canal with Rosetta, while the Mahmudieh Canal connects it with Cairo. It is specially interested in the cotton and sugar industries, and

thoroughly dominates the import and export trade of Egypt. As a Mediterranean port it is now surpassed only by Genoa and Marseilles. Cotton spinning and weaving, oil-pressing, rice-milling, paper, soap, and brick-making, are among the varied industries of Alexandria. Some miles to the east is the textile centre of Kafr el Dawar, concerned with cotton and rayon.

Rosetta and Damietta particularly serve the water-routes at the ends of which they are situated, but do not possess facilities for large shipping, as they are badly silted.

Tanta (140,000 people) is the largest city within the delta; it is an important rail junction, with cotton-seed, linseed, and soap industries. North-east of it is Mehala el Kubra (120,000) with modern cotton-spinning and -weaving mills.

Asyut (90,000) is the largest city of Upper Egypt. It makes rugs and cotton goods, and is famous for its glazed pottery. Aswan has large granite quarries, and, like Luxor, is a winter resort visited by many tourists. Near the latter place are the famous ruins of Thebes. The filling of the Aswan reservoir drowns the Temple of Philæ. The hydro-electric power developed at Aswan is largely used at the near-by iron ore mines and in the manufacture of nitrogenous fertilizer.

The important oases of Kharga, Dakhla, and Siwa lie on an old caravan route to Benghazi in Cyrenaica, on the border of which Egypt now possesses the small port of Sollum. Farther south, and adjacent to this border, are some little-known oases—notably Owanet—inhabited by the fanatical Senussi sect. It was at Owanet that remarkable rock-drawings of giraffes (about which the settled Berber inhabitants had no traditions) were discovered in 1923. Giraffes being unknown in this area to-day, these drawings, as well as local traditions of extensive grazing-grounds here on the Sudan border, may be taken as evidence of desiccation since glacial times.

The *communications* of Egypt are relatively simple. The Nile provides a continuous waterway, used not only by the dahabeeyah (the picturesque native craft), but also by diesel tugs, self-propelled barges, and shallow-draught steamers, regular services of which ply on the river and maintain connexion with Sudan. The dam at Aswan is avoided by a canal with locks.

The main railways (State-owned) are of standard gauge. The chief line connects Alexandria with Cairo, and runs up the Nile to Shellal, just above the First Cataract. The long-projected continuation to Wadi Halfa is under construction. These State railways are, apart from the narrow-gauge branches to the western oases, of standard gauge. Cairo, besides a direct railway link with Suez, is connected across the Suez Canal (where El Kantara is the junction for Port Said) with the Levant countries. From Alexandria, a line continues along the Mediterranean coast to Matruh

Camel transport naturally obtains over the desert area.

The Suez Canal. Eight centuries B C. Necho constructed a canal between the Nile and the Gulf of Suez, and this was rebuilt on several later occasions. The Venetians investigated the possibilities of a canal from the Mediterranean to the Gulf of Suez when they found that the use of the Cape route affected their trade. Before the present canal was opened in 1869 there was organized camel transport across the isthmus, and the need for a canal to obviate the use of two shipping terminals was urgent.

Although some of Egypt's commerce passes through Port Said and Suez, especially the former, the importance of the canal is primarily as an ocean link. In comparison with the Cape route it saves about 4000 miles on the way from Western Europe to India, though the saving for the Far East and Australia is considerably less. For Mediterranean countries the saving is greater, and much of the modern importance of such ports as Marseilles, Genoa, and Venice is derived from the use of the Suez Canal

There are no locks on the canal. It passes through the Bitter Lakes, which occupy the old head of the Gulf of Suez and serve to neutralize the slightly higher level of the Red Sea. It needs constant dredging and there has been a notable improvement in facilities for ships to pass. It takes vessels of 36-feet draught and is being deepened to allow the passage of those of 37-feet draught. The average time of the passage is about 10 hours, the speed is limited to 10 knots in order to preserve the banks. Dues are collected at Port Said; these are roughly equivalent to the running of a vessel for a week, so that the saving of time effected by using the canal and the nature of the cargo carried are important factors

determining its use. Traffic continues to increase, this is largely due to the development of Middle East oil, so that to-day oil-tankers provide a major part of the traffic. Another significant

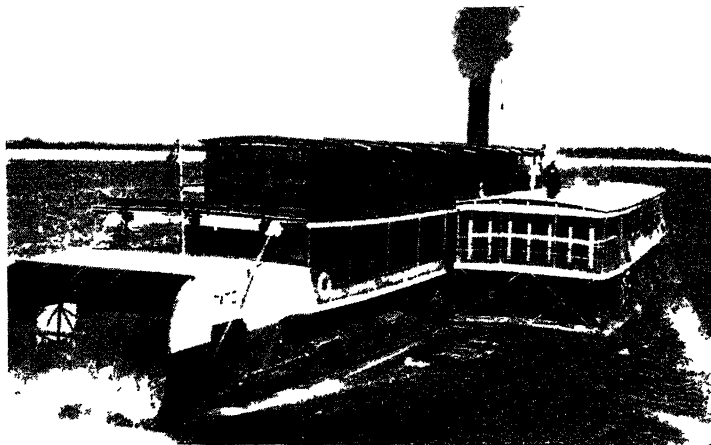


FIG 69. RIVER TRANSPORT IN SUDAN

Stern-wheelers are commonly used for river transport in Africa.

Sudan Government

feature of the traffic is the increase in the average size of vessels using the Canal. This point is illustrated by the following table.

YEAR	NET TONNAGE OF COMMERCIAL SHIPPING PASSING THROUGH THE SUEZ CANAL	
1913	5085 ships	20,035,000 tons
1938	6171 ships	34,418,000 tons
1958	17,842 ships	154,479,000 tons

The "Suez Canal net tonnage" given above is a considerably higher figure than the registered tonnage that is commonly used for British shipping statistics. For toll purposes a special method of assessing tonnage is used.

In 1938 half the tonnage flew the British flag To-day the proportion is much smaller, though British ships are still more numerous than those of any other country. Considerable numbers of ships now fly the flags of Panama, Honduras, and Liberia for reasons certainly not connected with the maritime trade of those countries Ships of the merchant navies of Norway, France, the Netherlands, Italy, and the U.S A make considerable use of the Canal In addition, some use is made of it for naval and military purposes

Port Said (population 180,000) is a fuelling-station of great importance. The port has a considerable *entrepôt* trade, besides sharing with Suez that part of the general sea-borne import and export trade which does not pass through Alexandria.

Port Fuad is opposite Port Said, it possesses important engineering and repair workshops. Besides manufacturing nitrogenous fertilizer, Suez refines Egyptian and imported oil, and, like Port Said, supplies oil to vessels using this fuel. Both Port Said and Suez are connected with the railway-system of Egypt through the junction of Ismailia The provision of the Sweet Water Canal was a condition attaching to the original concession for the Ship Canal.

Trade. Because of her large population and large cotton export, Egypt has a substantial trade She imports considerable quantities of foodstuffs, notably wheat, flour, and tea, and some fertilizer for her agriculture She lacks timber, of which there is a large import, as there is also of tobacco for manufacture. Manufactured goods provide big items—textiles (especially cottons and woollens), machinery, iron and steel and electrical goods—while there are also large imports of motor vehicles and fuel and other oils Raw cotton dominates the export trade and is supplemented by cotton-seed and cake, the value fluctuates greatly with price and demand, and averages about 75 per cent. of the total In some recent years rice has made a substantial contribution, smaller items being onions, fuel oil, and phosphates. The trade with the United Kingdom has greatly fluctuated with political and financial difficulties, formerly a leading supplier and customer, the United Kingdom takes chiefly raw cotton and sends manufactured goods. But cotton is taken by, and manufac-

tured goods are sent by, most industrial countries. Wheat may be sent by Canada and Australia, and Pakistan sends jute and jute-sacks. Latterly much trade has been directed into U.S.S.R. channels.

Alexandria handles the bulk of the oversea trade, the rest—a growing proportion—is shared roughly equally between Port Said and Suez. A valuable import trade, though small in tonnage, passes through the Cairo airport.

The above paragraphs pay no regard to the trade with Sudan, which goes mainly through Wadi Halfa and Suez. It is relatively small. Live animals, animal produce, dura, oil seeds, and dates are among the imports in exchange for a variety of manufactured goods, oil, rice, and confectionery.

SUDAN

In 1899 this territory became a condominium jointly administered by Britain and Egypt. In October 1951 Egypt unilaterally denounced the arrangement. Subsequently the two countries, in agreement with Sudan representatives, arranged for a general election to be followed by Sudanese autonomy. January 8, 1954, became the 'appointed day' for the beginning of a three years' 'transitional period' during which the administration was to be Sudanized and the British and Egyptian forces withdrawn. Actually, independence was secured at the end of 1955. The northern two-thirds of the country is inhabited by Moslems, living mainly by the Nile, this is the politically active section of the population and has many links with Egypt. In the south are pagan Negro tribes relatively primitive in their development. The new republic is faced with the problem of welding its vast territory and varied peoples into a viable political unit.

Sudan includes a long stretch of the Nile from Nimule (4° N.) to Wadi Halfa (22° N), all the drainage from the Congo divide, part of the upper drainage of Lake Chad in the Dar Fur Province, a large part of the Libyan Desert, the lower courses of all the Nile tributaries from Ethiopia, and the deltas of the Gash and Baraka rivers, which run from the northern fringe of that country. Its coral-fringed coast-line is on the Red Sea, a desert belt which is nevertheless of vital importance

greatest concentration of population is in the Khartum-Gezira area. The Khartum and Blue Nile provinces cover 63,000 square

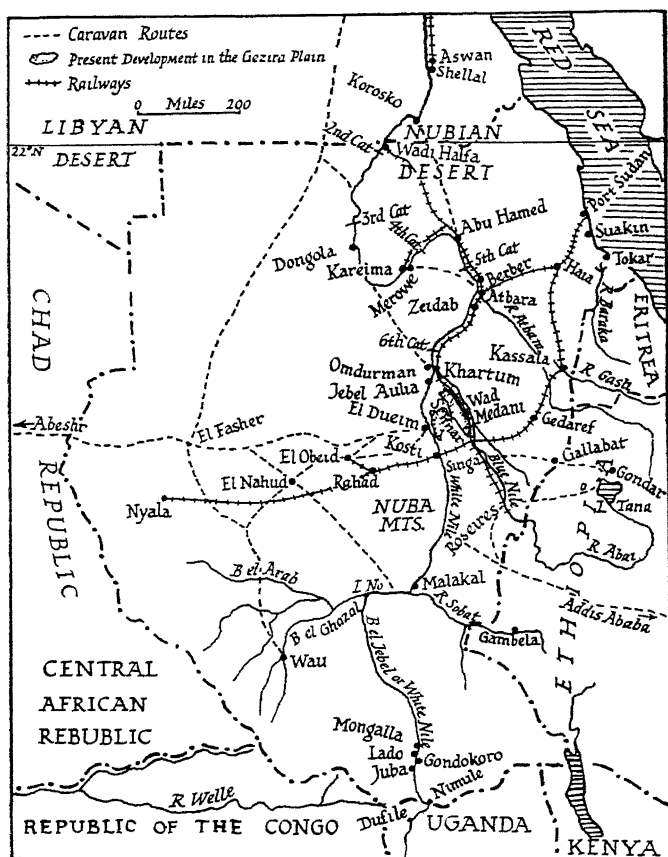


FIG 71. SUDAN

The importance of Port Sudan in relation to railway development should be noted

miles with $2\frac{1}{2}$ million people; the three southern provinces of Bahr el Ghazal, Upper Nile, and Equatoria have about the same

population on a total area of 260,000 square miles. Great tracts of the country have very few or even no people.

Vegetation and Productions. The 20-inch annual isohyet (see Fig. 72) provides a rough guide to some of the vegetation features of Sudan. In general, north of it lies scrub land with acacia and grass grading-off through acacia scrub to true desert; south of it lies savanna in a wide belt, a zone, however, with varied savanna features and central sudd swamps. Forests lie to the east and south—thorn forests of the middle section of the Blue Nile merge eastward into the more temperate and wetter forests of the lower slopes of the Abyssinian Highlands, while southward towards the Congo border and Uganda there is a good deal of forest of the hot, wet type, though much of it may be described as wooded savanna. It is estimated that one-third of the country is desert and swamp, rather more than a third is forested, and the rest is available for farming. There is a little shifting cultivation in the forests of the south; otherwise only some 3 to 4 per cent. of the available land is cultivated, more than a quarter of which is under irrigation. Some 2 million acres are at present irrigated—half in the Gezira Plain and the rest in the Gash and Baraka deltas and along the Nile (basin and pumping).

Broadly speaking, north of the latitude of El Fasher the vegetation cover is negligible. Dates are a cash crop in this belt, there being some export to Egypt from the districts by the Nile. South of this there is the belt important for gum arabic, and as the rainfall increases the dry region merges into cattle-producing savanna-lands, leading on to the forests of the south. The wooded lands are the source of fuel, and much charcoal-burning is carried on. The main food-crop is dura (millet), while cotton, which may suffer from cold weather in the irrigated districts to the north, can be grown as a 'winter' crop in the rainy districts of the south. There is a limited amount of basin irrigation by the Nile towards the Egyptian frontier.

The chief dura-growing area lies south of a line joining Khartum with Kassala, and extraordinary variations in the total crop are revealed in the table on p. 165, which shows the yield in selected years in the chief dura-producing areas.

Dura production is a matter of Government concern, for the

increase in the production of both rain-grown and irrigation cotton would, unless appropriate measures were taken, lead to a neglect of the staple food. Dura also provides the native beer, the dura-stalks are fed to animals and they also provide material for hut-building. The crop is almost entirely produced for home consumption, but in good years there is some export, notably to Egypt and Ethiopia.

DURA CROP (THOUSANDS OF TONS)			
1920	1921	1937	1938
156	511	363	283

Gum arabic held the leading position among the products of the region until 1924, when cotton took first place in export values. Sudan produces 70 to 80 per cent. of the world's supply of gum arabic which is used principally in medicine, in confectionery, and in textile manufactures to give lustre and finish to cloth. The trees (varieties of acacia) are tapped for their liquid. Lumps of gum harden on the branches, these are collected, and exposed for weeks to the sun till they are nearly white. Indiscriminate tapping and strong demand led to picking being carried out over wider and wider areas, and the Government now issues seed. Kordofan is the chief producing province, the gum being auctioned at El Obeid, El Nahud, and other centres. A good deal also comes from the Blue Nile province and some from the Dar Fur and Kassala provinces.

Cotton has become so dominant a crop as to constitute a danger, for the prosperity of the country has become dependent on variations in the production and in the price it commands. It is grown on rain-land, on flood-land, and on land watered by perennial irrigation. American 'middlings'—*i.e.*, American varieties, of medium staple—are grown in the rain areas, chiefly in South Kordofan and some in the Blue Nile and Equatoria provinces, a little comes from districts watered by pumping schemes—for example, at Zaidab, just south of Atbara. The Government has interested itself not only in distributing seed, but in pumping

rivers (at Kassala and Tokar), but the crop in these districts varies with the amount of flood-water.

The triangular area known as the Gezira (the word means

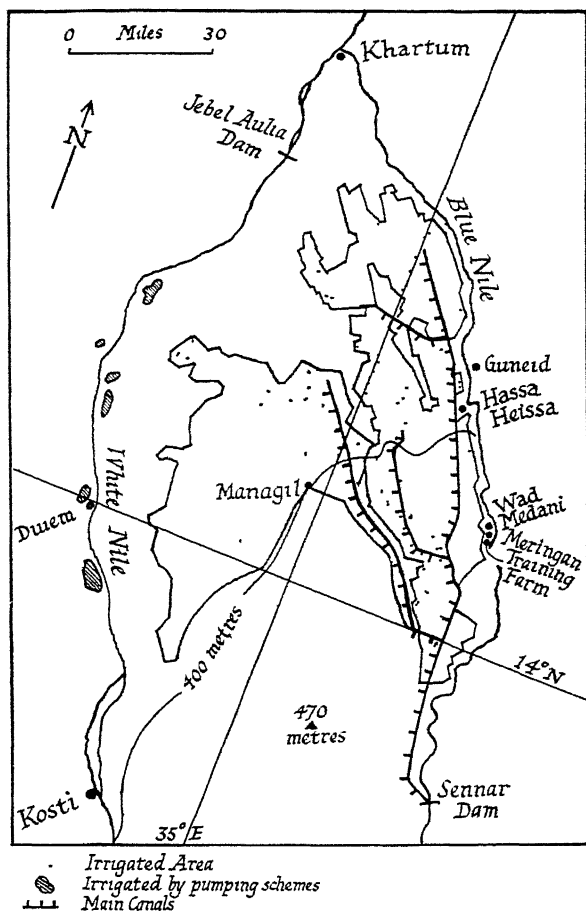


FIG. 73. THE GEZIRA—IrrIGATION

The Managil extension is scheduled for completion in 1961. Important pumping schemes have been developed in the Guneid district.

Based on an official map

"island") covers some 5 million acres, of which $1\frac{3}{4}$ million are irrigable. The original scheme aimed at the irrigation of about a million acres, as indicated later this area has been greatly extended. The development of the Gezira has proved to be perhaps the most important single economic and social enterprise of its kind in Africa. The dam dates from 1925, it was provided by the Government; management and development were in the hands of a cotton-growing syndicate. The profits were shared between these two and the tenant farmers. In 1950 the Government took over the whole scheme, and it is operated by the Sudan Gezira Board, which in addition to complete responsibility for the economic side is charged with the task of building up social and community life. Any surplus, after meeting statutory obligations, goes to the Government or the tenants.

From the first the need for careful husbandry and for the growth of foodcrops was realized. The standard tenancy is 40 feddans (a feddan is 1 038 acre), of which 10 are under cotton, 5 under dura, 5 under lubia,¹ and 20 fallow; wheat may also be used in a rotation. The standard tenancy is large for a family, for new tenants it is now halved. In any one year up to 220,000 feddans of the original area are under cotton and more than half the total area is resting. Cotton is essentially a winter crop in the Gezira, receiving its last watering in April. Attention is given to spraying (the pink bollworm is the chief pest), the provision of fertilizer, research, water supply, sanitation, and many other matters of importance for development and welfare. Supplementary labour for picking and other tasks comes from West Africa (particularly Mali and Nigeria)—workers who are on their way to or from Mecca. Ginning is carried on at Wad Medani (grown to a town of 60,000 people) and other places on the Blue Nile, and at Port Sudan. Much cotton-seed is available for export.

The yield of cotton per acre is very variable (it has varied from $1\frac{1}{2}$ to $6\frac{1}{2}$ cantars per feddan), and the average yield is substantially below that of Egypt. The yield is likely to rise with the planned increase in the use of nitrogenous fertilizer. It may be noted that

¹ A pulse crop. Immature pods are used as a vegetable, the bean is eaten baked or roasted, the standing crop is grazed by cattle, good for milk and meat, the crop is a good restorative in a rotation.

the use of the tractor is increasing, especially through the activities of producer-co-operatives, the formation of which is encouraged by the Government.

Some significant developments in connexion with the Gezira area are in progress or planned. Some 400,000 acres are now under gravity irrigation in the Managil district, where preparations for the irrigation of a further 400,000 acres should be completed in 1961. Further expansion is contingent upon the provision of the proposed dam at Roseires. Attention is also being given to the



FIG. 74 IRRIGATION COTTON IN THE GEZIRA—SECOND WATERING

The irrigation channels are filled only at intervals during the growing period
Sudan Government

development of pumping schemes (of which there are already many small ones along both the White and Blue Niles) on the east bank of the Blue Nile—a large scheme of this kind at Guneid—irrigating over 30,000 acres—has already come into operation and others are under construction. It may be noted here that future projects include the provision of a dam for irrigation purposes on the Atbara towards the Ethiopian frontier, though this might be a priority if the resettlement of Sudanese population displaced by the proposed High Dam at Aswan became necessary. Cotton as a cash crop in a rotation is envisaged in connexion with all this expansion of irrigation agriculture.

Some other products have economic importance. Sesame is grown chiefly as a rain crop in the middle zone; it finds its chief market in Egypt. Ground-nuts are also grown, in Kordofan province, and again there is some export to Egypt. There are also small exports of senna, pulses, melon seed, ghee, dates, and dom-palm nuts (vegetable ivory). Rubber-trees occur along the Congo divide, but there is no significant collection.

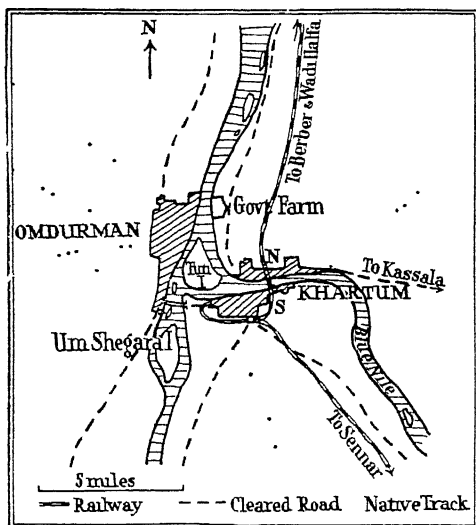


FIG 75. THE POSITION OF KHARTUM
Note the long road and tram bridge linking South
Khartum with Omdurman

It is probably impossible to assess accurately the livestock wealth of Sudan. Cattle are estimated at 5 million, sheep at 6 million, and goats at 5 million. There are almost no pigs in the country. Hides are of inferior quality; a good deal of tanning goes on. There is considerable internal trade in livestock, and as the agricultural population increases it will become more important; there is a substantial export of live animals and of hides and skins. Camels are very numerous in the dry zone, totalling 2 million; the Northern Province exports them to Egypt. Soil

erosion, arising from over-grazing by the numerous cattle, is a pressing problem in the savanna areas.

Fishing is of considerable importance along the rivers of the south, contributing much to the economy especially of Nilotic tribes. There is some trade in dried and salted fish with Egypt and the Belgian Congo. There are also local fisheries along the Red Sea coast, chiefly for trochus and mother-of-pearl.

Sudan has little mineral wealth. A little gold is worked at Gabait and other places in the Red Sea Hills. Much salt-panning takes place at Port Sudan—a valuable industry. There are no fuel resources, except timber and charcoal, and little opportunity for power development. There is consequently no proper basis for industry. Some food-processing, the pressing of oil from cotton seed, ground-nuts and sesame, tanning, salt-panning, and a few factories, including a brewery at Khartum North, a cement factory at Atbara and a number concerned with soap and soft drinks, make up most of the industrial development which is restricted by the general lack of fuel and power.

The Government is actively concerned with education and development; experiments have been made with mechanized cultivation in the middle belt; the Equatoria Projects Board aims at introducing improved cultivation among the primitive peoples of the south; research is carried out in connexion with soils, plant and animal breeding, and stock immunization.

Towns and Communications. Sudan has now 2000 miles of railway, while Government steamers ply on all navigable sections of the Nile and its tributaries. Good roads are few; most are only rough tracks; motor vehicles are relatively few and need to be equipped with special low-pressure tyres. As there is no through connexion by rail with Egypt, railway goods traffic concentrates upon Port Sudan.

Khartum has some 90,000 inhabitants (125,000 with Khartum North), it is situated at the junction of the Blue and White Niles, between the two rivers, and commands a great deal of river-traffic, as well as the Nile valley railway. Development in the Gezira has increased its importance, and besides being the capital it is an important centre of education (with a university) and of agricultural research. It is connected by a road and tram

bridge with Omdurman, the large Dervish market-town of some 130,000 inhabitants which sprawls for seven miles along the White Nile opposite Khartum. Omdurman is largely a mud-built town, and is a centre for many native crafts. South of Khartum the railway goes up the Blue Nile to Sennar, and then turns westward to reach El Obeid (70,000 people), an important market centre in



FIG. 76. SCENE IN OMDURMAN

Omdurman is a big Sudanese market

Sudan Government

Kordofan for gum, dura, sheep, and cattle. North of Khartum the railway cuts across the great bend of the Nile marked by the caravan terminus of Dongola to Wadi Halfa, an important frontier-station, through which passes much of the trade with Egypt. Just south of Berber the railway sends off at Atbara the important branch leading to Suakin, the old Arab slave-port, and to Port Sudan. Suakin has a tortuous entrance through a coral reef, but Port Sudan, some 30 miles to the north, has a convenient opening, and is now a modern port with proper shipping facilities. It takes ships of 33-feet draught, is an oil-bunkering port, with

pipe-lines for fuel oil and water. Practically all the oversea trade of Sudan passes through it, and its industries include cotton-ginning and salt-panning

At Haia this Red Sea line sends a branch southward to Kassala, in the cotton-growing Gash delta. The extension of this line to Gedaref and Sennar assists a fertile area

Other rail links include that between Sennar and Roseires, and a recently completed 400-mile long branch from Rahad westward to Nyala in Dar Fur Province

The main air route from Britain to the Cape passes through Sudan, and Khartum has not only mail and passenger connexions with the principal towns of the Nile valley, but feeder services to many other places in Africa; it is an important air junction.

Government steamers ply between Sennar and Roseires and southward from Khartum to Juba, from which point a motor-road runs to the frontier-station of Nimule, and beyond, through Uganda, into Kenya Colony. There is navigation from Nimule to Lake Albert. The Bahr el Ghazal is navigable up to Wau (9000 inhabitants) and the Sobat up to Gambela, a trading station some distance inside the Ethiopian frontier. Although faster and more modern craft are gradually coming into use, river transport is unlikely to develop further owing to the growing importance of motor transport

There is still considerable dependence upon camel and donkey transport in the north and human transport in the south. The isolated Dar Fur Province is arid in the north, but has cattle-pastures in the south. Millet, sesame, and cotton are the chief crops, and El Fasher (24,000) is the largest centre.

Trade. It is cotton which gives importance to the trade of Sudan, though the value fluctuates considerably, in recent years it has averaged two-thirds of the total exports and pays for substantial imports

The import trade includes foodstuffs, particularly sugar, coffee and tea, coal, petroleum and fuel oil, and a large range of manufactured goods, chief among which are cotton textiles. Soap, hardware, iron and steel, machinery, and motor vehicles are significant items, but none is large. The United Kingdom is the leading supplier, sending notably sugar, machinery, motor

vehicles, and cotton goods. Japan, Egypt, and India are all important suppliers of cotton goods. The United Kingdom is the main market for exports, which include (besides cotton) cotton and other oil seeds, gum arabic, and hides and skins. Cotton-seed exports rival those of gum arabic for second place in value. Egypt and India have a significant share of the trade of Sudan.

CHAPTER V

THE EASTERN HORN

GENERAL CONSIDERATIONS

THIS economic region comprises the Federation of Ethiopia and Eritrea, French Somaliland, the Somaliland Protectorate (British), and the Italian Trusteeship of Somalia. It is a relatively small region, far from uniform in physical character; but, with every allowance for areas that are either too arid or too elevated for settlement, it has as yet experienced little development in the modern sense, and the total trade is very small.

Physical Features. The region groups itself round 10° N., stretching from the equator to 17° N. Physically it is part of the Archæan plateau of Africa, cut through by the Rift Valley from the Strait of Bab el Mandeb to Lake Rudolf. On both flanks of this Rift Valley prolonged volcanic activity has spread vast sheets of lava, piled up into elevations that often exceed 10,000 feet, and reach over 15,000 feet in Ras Dashan, which, with other peaks, is snow-capped. The coastal region is generally low, except along the northern margin of the faulted block of the Somali peninsula, basically of ancient crystalline formation, though overlain in places by younger sedimentaries, which projects towards Cape Guardafui, forming an eastward extension of the main African plateau.

The Abyssinian plateau is dissected by numerous rivers, especially on the west and south—rivers whose torrential character has led to the cutting of deep gorges, some of those on the west approaching a mile in depth. The sides of these gorges often show the typical development of basaltic columns. The rugged nature of these highlands is unlike that of most African mountain areas; the gorges have the effect of cutting the plateau into largely flat-topped masses known as *ambas*, at the same time making communication specially difficult. The rivers have summer floods from monsoon rain. The most important is the Blue Nile, which takes

its rise in Lake Tana, 1200 square miles in area, at a level of nearly 6000 feet, and occupying a broad depression in the heart of the plateau. The Blue Nile in Ethiopia passes under the name of the Abai, for twenty miles after leaving Lake Tana it flows over the plateau, then drops over the Tisesat Falls, and subsequently in its deep trench it is marked by cataracts and rapids almost the whole way to Gambela. Apart from one or two sixteenth-century Portuguese bridges it has only dry-season mule crossings. In the north of this plateau rise the Atbara, Gash, and Baraka, rivers that find their way to Sudan. The Rift Valley is marked by an inland drainage system including Lakes Abaya, Stephanie, and Rudolf, as well as by the Hawash river, which fails to reach the Gulf of Tajura. A few hot springs form the only remnant of former volcanic activity, and one of them is thought to have influenced the siting of Addis Ababa. No permanent stream finds its way either to the Red Sea or the Gulf of Aden. In the south-east the Juba and the Webi Shebeli combine to form a deltaic area on the coast near the equator.

Climate and Vegetation ✓ The highland character of much of the area not only results in a lower temperature than the latitudes would suggest, but exercises a dominant influence upon the rainfall. In spite of a high altitude of the sun throughout the year, night frosts may be expected everywhere above 6000 feet, and there is some winter snowfall on the highest parts. The figures in the following table contrast the plateau with the Red Sea coast

TOWN	ALTITUDE	HOTTEST MONTH	COOLEST MONTH	ANNUAL RANGE
Addis Ababa	8005 feet	65 5° F	58 5° F	7° F
Massawa	64 feet	94 5° F	78° F	16 5° F

The mean annual temperature at Massawa is 86° F, which is almost the highest in the world. This is typical of the Red Sea and Gulf of Aden coasts. The coast of Italian Somaliland is somewhat less hot, as the Indian Ocean has a more modifying effect than the enclosed Red Sea.

The highland stands athwart the south-west air stream of summer when the inter-tropical front in July lies round its

northern margin, the west and south-west sides receive a heavy summer rain, which, falling in a relatively short period, leads to the flooding of the Nile. The heaviest rainfall is probably nearly 80", and is found in the south-west; it decreases towards the north and east, Gondar receiving about 40" and Addis Ababa nearly 50"¹ In the rain-shadow to the east, where excessive heat prevails in summer, the amount of rain is negligible. Such rain as is received here comes chiefly in the cool season of the year and is brought by north-east winds, which also cause a slight precipitation on the plateau. Massawa's total is 7½" and that of Berbera 2½"

The Danakil lowland and the coast-lands are arid and barren, but with increasing rainfall towards the higher ground behind the country gradually improves, passing through scrub-land with drought-resisting, gum-producing plants and a certain growth of tall, tufty grass into something like savanna conditions. At about 6000 feet forests of box and juniper are common. The less elevated parts of the plateau itself are to a great extent well wooded. The deep lower western and southern valleys have forests of the tropical type, in which coffee-trees and rubber-vines flourish, above these are forests of a more temperate character, with wild figs and olives, junipers, and yews. At the higher levels trees are generally absent, and the conditions of a temperate grass-land type of vegetation prevail. Above about 12,000 feet the plateau is barren. The animal life is equally varied. At the lower elevations, in the swamps and streams, the rhinoceros and hippopotamus are met with, the latter even being found in Lake Tana. The lion and leopard, as well as the zebra, antelope, and hartebeest, occur on the plateau and the lower lands to the east, while domestic animals are naturally common throughout the region.

Development. The backward development of this economic region chiefly arises, either directly or indirectly, from the physical conditions. It has suffered for centuries from religious, tribal, and other wars, and to this also must be attributed a good deal of the

¹ Addis Ababa has two maxima—typical of the plateau—a very slight one in April and a considerable one in August. The cause of the early rains is not clearly understood, but the heavy summer rains (23" in July and August) are associated with a strong south-westerly air current.

present under-development. Aridity along the coast and the inaccessibility of the interior are obvious drawbacks. The existence of the extraordinary Coptic Christian island of Ethiopia in a sea of Mohammedanism is to be attributed to physical isolation. The sharp division of the highland from the lowland has led to a strong development of national feeling. It is of interest that useful work was done in the country in the sixteenth century by Portuguese priests, who were eventually expelled in 1633, that Britain felt compelled to send an expeditionary force in 1867-8 when the Emperor Theodore was defeated at Magdala, a defeat that was followed by a considerable period of internal strife, a common feature of Ethiopian history; and that Italy's first attempt to conquer the country was defeated at Adowa in 1896. Suspicion of strangers, an effective feudalism, and a general absence of interest in anything beyond the borders of the country were combined with the difficulty of co-ordinating the government of a highland area almost devoid of effective means of communication, so that Ethiopia was almost beyond the reach of Western influence. Despite the French railway from Jibuti to Addis Ababa, completed in 1917, and such an innovation as an occasional modern reaper and binder, Ethiopia lived largely for itself. There was little incentive to produce for export, and primitive agricultural methods prevailed. The wants of the people were simple, there was little demand for foreign goods, and internal trade was largely a matter of barter. There was a large variety of products, both animal and vegetable, but any mineral wealth that existed had scarcely been exploited.

Such were the general conditions prevailing in the main mass of the Abyssinian Highlands at the time of the Italian conquest in 1936. Italy already had extensive territories in Eritrea, which included the extreme north of the highland mass, and in Somaliland, the rest of which was shared by France and Britain. These lands are generally arid and susceptible of only limited economic development. Something has been done to induce the inhabitants, who are principally nomads, to adopt a sedentary life, and, with the aid of irrigation, to settle colonists. Italy's occupation of most of the area came to an end during the Second World War, Ethiopia has again become independent, Eritrea is federated with

Ethiopia, and Italian Somaliland became a temporary Italian trusteeship until 1960. New influences are at work; these include technical and other assistance under United Nations auspices.

THE FEDERATION OF ETHIOPIA AND ERITREA

The Ethiopian claim to Eritrea was based primarily on the physical, racial, and religious continuity marked by the extension of the Abyssinian Highlands into Eritrea, and on the desirability of having access to the sea. The claim was met by a United Nations decision that in 1952 Eritrea should have local autonomy (excluding defence, foreign relations, and customs) and be federated with Ethiopia, recognizing the Negus or King of Ethiopia as head of the Federation. Ethiopia itself is divided into a number of provinces each under a *Ras*, a local lord; the Rasas still have much the character of feudal lords and formerly were responsible for much internal strife. The total area of the Federation is some 456,000 square miles, one-tenth of this being that of Eritrea; the total population is variously estimated at between 13 and 20 millions, of whom 1,200,000 are in Eritrea. The last figure is reasonably reliable.

Ethiopia

This is a region of bold physique and diverse peoples. The Abyssinians proper number barely one-half of the population; they profess a monophysite form of Christianity derived from the Coptic Church of Egypt. The Church is a dominant factor in the life of the people; it owns about a third of the land, and a considerable proportion of the adult male population is incorporated in the ecclesiastical organization The Abyssinians proper are found in the provinces of Tigre, Amhara, Gojam, and Shoa (which contains the capital)—*i.e.*, in the most elevated areas. The other provinces are acquisitions. The Abyssinians¹ (of whom the Amharas are the most numerous) are of Hamitic origin, with both Semitic and Negro admixture. The non-Abyssinian population includes Hamitic Gallas, fully a third of the total population and mostly Mohammedan, in the south-east, Somali tribes in the

¹ The name is derived from a word, *abeshi*, meaning 'mixed'

east, and Negro tribes in the south-west. There is a small group known as the Falashas, of Jewish faith, mainly found north of Lake Tana, and providing the principal workers in iron in the country. Besides these there is a small trading population of Jews, Arabs, Armenians, Indians, and Europeans. Until quite recent times the prevalence of ill-paid soldiery and a strong feudalism

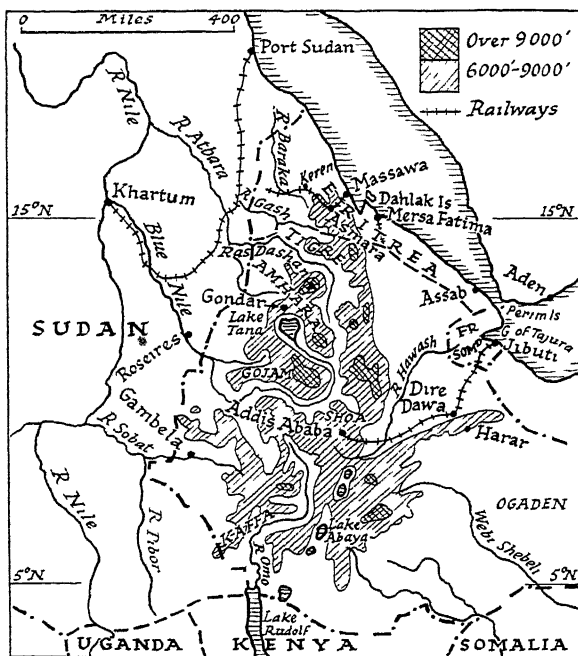


FIG. 77. THE ETHIOPIAN AREA

Rivers radiate from the Abyssinian Highlands

hindered progress; a governor could command the services of numerous labourers at practically no cost to himself, while slavery, though being slowly suppressed, was prevalent.

Productions. Most of the people live at an elevation above 5000 feet, except in the drier east, because the deep valleys of the south and west are swampy and unhealthy, besides being forested

Rivers are not arteries of communication in Ethiopia—they are obstacles—and good bridges are rare. Three zones are distinguished according to elevation.

(1) The Kolla, up to 5000 feet, chiefly in deep valleys, where bamboo, rubber-vines, and wild coffee are found.

(2) The Voina Dega, or "wine highland," 5000 to 8000 feet, marked by a good deal of warm temperate forest and cultivation.

(3) The Dega, or highland, chiefly open, grass-covered plateau country and allowing temperate cereal cultivation to about 12,000 feet. This is largely pastoral.

The rich soil of the valley bottoms of the Kolla grows some cotton, rice, and sugar-cane. In the south and south-west are extensive forests of wild coffee, besides which there is an increasing cultivation of the long-berry Mocha variety in the south-east, especially in the Harar district, an important outpost of Arab influence. Some three-quarters of the total crop is at present from wild trees in the Jimma and Sidamo provinces. In the south-west of the Jimma province are large areas of wild coffee in a region almost devoid of communications and labour supply. In some eastern districts the date-palm is cultivated, and cattle and camels are common in the drier parts. The Voina Dega is characterized by the production of the vine, olive, orange, tobacco, and cereals, and the rearing of cattle, sheep, goats, horses, donkeys, and mules. In the Dega cattle and sheep are numerous, and horses are bred, especially in the region north-west of Addis Ababa. Dura is grown at the lower levels; wheat and barley are common (the latter being carried to the upper limit of cultivation, about 12,000 feet); pulses are important, and potatoes do well. Oil-seeds are grown throughout the cultivated area, the chief being niger, sunflower, and ground-nut. At the lower elevations two and even three crops can be raised in the year. Honey and honeycomb from wild bees are widely collected, and in the arid east are acacias, yielding gum arabic, as well as other gum-yielding trees.

There are some small indications of agricultural development on modern lines. In the Hawash valley at Wonji, some 40 miles from the capital, is a sugar plantation—with factory—irrigated by gravity from the river; expansion of this project is planned. Cotton is receiving attention, at present it is harvested from

perennial trees, but its planting as an annual crop has been undertaken on a small scale in a number of widely separated districts. The establishment of cotton as a staple crop is being technically studied. Tobacco, rice, and tea are other crops receiving attention, while through the work of agricultural schools it is hoped gradually to raise the general standard of farming. At present, shifting cultivation commonly prevails except in the neighbourhood of the capital, and only very few farmers have any acquaintance with modern fertilizers and agricultural machinery.

The hay crop is an important element in the pastoral economy, and the cutting is initiated each year by the local lord with great ceremony. Small hand-sickles are traditionally used, but 'technical assistance' under United Nations auspices has led to the introduction of the scythe as well as of improved ploughs. (The highland pasture is excellent for the ordinary domestic animals.) Brushwood is the normal fuel, but there is a serious deficiency on the plateau. There is believed to be an abundance of mineral wealth, including coal, iron, gold, copper, sulphur, and potash. Iron is worked for local requirements, and some alluvial gold is found in the western and southern valleys, notably at Adola, while a little platinum is worked in the Wallega district, south of the Abai.

Industry in the modern sense cannot as yet be said to be established. Coffee-cleaning and -grading machinery is in use in the Harar area; Addis Ababa has some factories, mostly established by the Italians, making sacks (from a local fibre) and shoes, as well as large flour mills; there is a little cotton-spinning and a cement factory at Dire Dawa. Tanning has substantial importance. Beyond this, most industry is at the domestic stage. Ethiopia lacks coal and oil. There is a number of small hydro-electric and thermal power stations, and a large dam for power and irrigation has been completed on the Hawash river near Addis Ababa.

It is doubtful whether, during her occupation, the writ of Italy ran very far from the capital. The Italians left behind some good roads, a few factories, and the results of some preliminary planning. Following the expulsion of Italy during the Second World War, Britain occupied the country for some time, and it is possible that this helped to modify further the old feudalism and the restrictions on some of the non-Amharic peoples, besides preparing the

way for technical and other assistance that has since been given. Only a small beginning has been made with education, and this is mostly confined to the capital and large centres. Ethiopia is far from being modernized, but it may be said that the lines of important changes have been laid down.

Towns and Communications The farming remains on the whole primitive, and the people live in villages composed of cone-shaped thatched huts with neither chimney nor window. The towns are mostly only villages. The position of the capital varied in earlier times, but became fixed at Addis Ababa (about 350,000 population), owing to the planting and conservation of woods of eucalyptus to provide fuel. The growing importance of the central government and the beginnings of industry account for the doubling of its population in the last twenty years. The capital became the principal centre from which the Italians built out for strategic purposes a series of roads which has since been extended, so that now some 3000 miles have an all-weather surface; there are also some new bridges. Some 12,000 motor vehicles use these roads and others principally in the neighbourhood of Harar. Otherwise, means of communication are traditional—the ox-wagon and mule or donkey transport, with the camel in the arid areas; in the highland areas roads or tracks are few and very difficult. The only railway is the French metre-gauge line, 380 miles long, that links Addis Ababa with Jibuti in French Somaliland; this was difficult to construct and difficult to maintain, for unruly Danakils found the track a useful source of iron and timber. Trains run thrice weekly each way and only in daylight.

✓ Harar (25,000 inhabitants) is an old walled city and the chief Moslem centre in Ethiopia. It is an important trading-centre on a fertile upland famous for its high-grade coffee, and is connected by road with Dire Dawa (35,000) an important town with a little industry on the railway. Gondar (22,000), the ecclesiastical capital, is in the heart of the Amhara country; it has road communication across the Abai with the capital and caravan routes to Sudan. Jimma is a notable centre in the south-west, from which it is hoped to develop the coffee resources of the area.

Addis Ababa has valuable air connexions, mostly local to this part of Africa; these are particularly useful in view of the paucity

of other forms of communication. The Sudan Government maintains a steamer service from Gambela, on a tributary of the Sobat, to Khartum from January to November.

Eritrea

This former Italian colony had before the Second World War some 60,000 to 70,000 Italians, to-day these number only about 17,500. The country has two main regions—the arid coast belt, sandy in character and with a Moslem Somali population spreading into the foothills, backed by highland (except in the central part where there is a deep depression) with an Abyssinian population of Coptic Christians. The coast, with about 7" of rain, chiefly in winter, is hot and arid, but the highlands are not only more temperate, but receive a fair amount of summer monsoon rain, Addi Ugri, at 6600 feet, receiving 21 5". The vegetation varies from semi-desert to savanna and warm temperate forest—the last in the highland districts. Pastoral occupations generally prevail, even in the highlands where cultivable land is limited. Transhumance is common, and many Somalis are nomads.

There are large numbers of sheep, goats, and cattle. Asses and mules are widely used for transport, as well as camels and the ox-wagon. Wild products that are collected include beeswax and honey, dum-palm nuts, and gum arabic. The Italians developed a little irrigation from the streams that come from the highlands, more particularly in connexion with cotton and sugar, and prospected for minerals, gold is worked in the neighbourhood of the capital. Of more importance at present is the pearling industry carried on in the Dahlak archipelago off Massawa. The value of the pearl-fisheries is augmented by that of trochus-shell. A good deal of salt is obtained near Massawa and Assab; windmills are used to pump up brine into basins for evaporation, and there are some modern installations.

The capital, Asmara (population 117,000) is situated at 7765 feet above sea-level. There is a narrow gauge (95 centimetre) railway, 70 miles long, reaching Asmara from Massawa, as well as a good road; and the Italians even constructed an aerial ropeway to connect these two places. Asmara has several Italian-

built factories and some good road connexions. The railway continues through the highland through Keren and Agordat nearly to the Sudan frontier. Massawa (27,500 inhabitants), on a small island connected with the mainland by a causeway, was formerly the chief port of Eritrea. The Italians improved it to accommodate large vessels. It is situated in an irrigated district. The port facilities at Assab, stated to be the best natural harbour on the Red Sea coast, are being developed. Between this place and Massawa is the potash port of Mersa Fatima.

Trade of the Federation The total trade is small. Imports include cotton yarn, grey sheeting, and other cotton piece goods (chiefly from Italy, India, and Japan), machinery, sugar, petrol, kerosene, and soap. Coffee provides more than half the total export value, hides and skins, oil seeds, pulses, ghee, and wax make up most of the rest. Half of the oversea trade is carried on through Jibuti, but Massawa and Assab are likely, especially the latter, to increase in importance. The west carries on a small trade across the Sudan frontier.

SOMALIA

Formerly Italian Somaliland, this territory of 180,000 square miles became an Italian trusteeship in 1951 and gained independence in 1960, when the former British Somaliland Protectorate joined it. Without the latter the population is about 1,300,000 and includes some 5000 Italians. A broad coastal lowland is backed by upland, which rises in the north to about 5000 feet; the highland region terminates in Cape Guardafui, which presents a steep wall to the sea, rising sheer for nearly 1000 feet. The monsoons blow parallel to the coast, so that the prevailing heat is little modified by rainfall. The Webi Shebeli and Juba rivers provide water in the southern area, and the Italians concentrated on agricultural development in this part, where some 25,000 acres are irrigated. Dura, maize, and sesame are grown, and cotton and sugar are successfully cultivated. Camels, cattle, and sheep are reared elsewhere, and Australian sheep are being introduced with a view to improving the fleece of the native breed. The northern part is mostly semi-desert land with a thin pastoral population; gums are collected.

The capital and chief trading-port, Mogadishu, has no deep harbour, but has been artificially improved, and is conveniently situated to serve the Webi Shebeli valley. A railway 70 miles in length runs inland from it, terminating at Villaggio Duca degli Abruzzi, one of several irrigation settlements. Merca, farther south, serves the export of bananas, of growing importance in the hinterland. Kismayu is a small port near the Juba mouth; it has a better harbour than Mogadishu. On the lower course of the Juba a steamboat service is maintained. The trade is largely in the hands of Arabs and Indians. There is a small export of the territory's products and an import chiefly of manufactured goods, especially cotton piece goods.

FRENCH SOMALILAND

This territory, once known as Obok, covers about 9000 square miles, with a population estimated at 68,000. The climate and productions are similar to those of Eritrea, though the region is somewhat more arid. There is, however, little export of local products, with the exception of salt, of which there is an increasing production. The coastal fisheries have local importance.

The inferior port of Obok has been displaced by Jibuti, on the southern side of the Gulf of Tajura. Jibuti (17,500 inhabitants, including 1000 French) is the chief *entrepôt* for the trade of Ethiopia, and has already been mentioned. With modern facilities, this place is an important port of call, chiefly for French ships, and has a commanding position opposite Aden, at the entrance of the Red Sea. The exports and imports are largely explained by the Ethiopian trade.

THE FORMER SOMALILAND PROTECTORATE

This former British protectorate of about 68,000 square miles became, when it joined Somalia in 1960, two provinces of that larger country, which has six. It has about 650,000 Somalis—of mingled Negro and Hamitic blood—with some 2000 Arabs and Indians in the coast towns. The coast-land is hot, sandy, and arid, and water has to be obtained exclusively from wells, it receives a very scanty and uncertain rainfall, chiefly in winter. Behind, the

land rises abruptly to a height of from 4000 to 7000 feet. The best vegetation, savanna in character, with forests of juniper and box, is found on the southern slopes, where a moderate precipitation due to the summer monsoon occurs. 'Tears' of gum (myrrh and

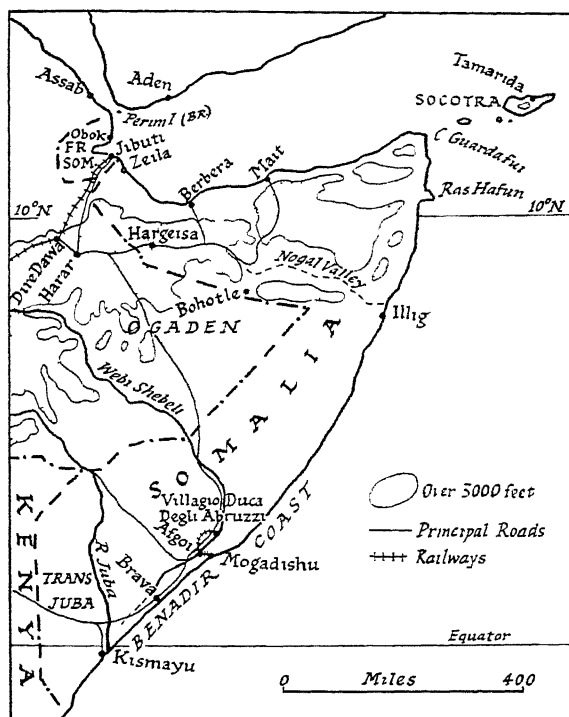


FIG. 78. THE SOMALI PENINSULA AND SOCOTRA

A striking feature is the strip of high plateau running parallel to the Gulf of Aden, this has a relatively good rainfall

frankincense) exude from drought-resisting trees, and there are some plantations of myrrh in the east. The Somalis are nomadic shepherds, and have hardly been introduced to agriculture; they suffered much from the cruel activities of the Mad Mullah, a fanatical Somali chief who raided the British area from the

Ogaden district of Ethiopia between 1901 and 1920. The country does not lend itself to the rearing of cattle, though some are found. It is well suited to camels, sheep, and goats, sheep being the most important. The blackhead sheep provides a fine-grained skin regarded as the best in the world for the manufacture of high-quality gloves. The number of stock carried is rather remarkable for such an arid country; they are estimated to include 1,200,000 camels, 2,350,000 sheep, 1,650,000 goats, and 225,000 cattle; the administration is aiming at controlled grazing to minimize overstocking. The administration also aims at developing agriculture; millet is now being raised in the west, and maize- and barley-growing are being encouraged. The best rainfall appears to be on the plateau in the neighbourhood of Hargeisa, which receives an average of 14" or 15" of summer rain annually, and attention is being given to promoting agriculture in this area; coffee and tobacco have been suggested as possible crops. The geological survey has proved the existence of coal, oil, salt, and other minerals, but there is no present exploitation of these. The coal, found south of Ankor, might prove important, because of its location near the Suez route. Transport is largely by means of camels, but there are considerable stretches of unmetalled motorable road.

The capital was Hargeisa (35,000 people) situated at 4200 feet on the plateau in the west, a less enervating site than that of the former capital, Berbera. Hargeisa is connected by road with Harar in Ethiopia, and with Berbera, the only port of much significance, whose population reaches 30,000 during the trading season (when the north-east monsoon blows, bringing traders chiefly from India). Zeila, a very old port, has lost most of its trade to Jibuti, only 27 miles away.

Hargeisa is linked by air with Aden, through which place most of the commerce is carried on; dhows are principally used.

The value of the trade is small. The leading import is grey cotton sheeting, chiefly from Asiatic factories, but fine quality white Manchester cloth is also imported. Rice, dates, and sugar make up the bulk of the rest. Skins and hides are the leading export; livestock are sent to Aden, and there are small exports of ghee and gum.

CHAPTER VI

WEST AFRICA

GENERAL CONSIDERATIONS

THIS economic region lies roughly south of a line joining the Senegal mouth to Lake Chad—*i.e.*, in the neighbourhood of 15° N. latitude. This line, although not a boundary between well-marked vegetation zones, roughly corresponds to the northern limit of sedentary life so far as it is dependent on rainfall, as well as to a distinct difference in population density. On the east the active economy of Nigeria contrasts with the relatively limited development of the central African region, thereby suggesting a boundary on this side. Elsewhere the Atlantic, which is the one route common to the whole region, limits the area.

Sailors from Dieppe are believed to have reached Cape Verde in 1364, and subsequently to have penetrated to Benin. In the fifteenth century the Portuguese, seeking the way to India, explored the coast, and were followed by English, Dutch, and other Europeans, including Swedes and Danes. The difficulties of carrying on trade along this coast were great; it offered little hospitality to shipping, and its unhealthy character (the “white man’s grave”) was a serious drawback. Raiding for slaves persisted until about a century ago, and militated against legitimate commerce. The early trading-stations were necessarily fortified, and a number of ‘castles’ remain, notably Cape Coast Castle and the Christianborg Castle at Accra, to-day the residence of the Prime Minister of Ghana. Until the nineteenth century European knowledge of the interior was negligible; the travels of Mungo Park were the first to give to Europe real knowledge of the Niger, which provides the chief drainage of this vast region. Nevertheless, the broad savanna highway of the Sudan had long been a road by which civilizing influences could reach the interior of West Africa, as is evidenced by the use of the Egyptian shaduf in the grass-lands and by the zebu, or humped cattle. To Egyptian

and Arab influence must be attributed the introduction of many of the characteristic crops and domestic animals of the savannas.¹ Hamitic penetration from the north has left its mark on the population of the northern regions. These horse-riding invaders were naturally stopped before the forest belt: forest and the tsetse fly prevented their reaching the Gulf

Physical Conditions. Stretching from just south of the Senegal, through the Futa Jalon plateau in Guinea, to the Jos plateau in Northern Nigeria is a huge area of ancient granite, gneiss, and crystalline rocks in a broad belt that lies very near the coast between Cape Palmas and the Volta mouth. This reaches an elevation of over 5000 feet in the Futa Jalon area and to the north-east of Liberia. In the Jos plateau 6000 feet is exceeded, and the railway at Bukuru reaches 4100 feet. This belt of ancient rock, broken where the Niger enters Nigeria, broadly speaking dips gently northward under the Cretaceous rocks of the Upper Volta and Middle Niger areas, and forms in the Futa Jalon plateau the great hydrographic centre of West Africa—the source of the Niger (Joliba), the Senegal, and the Gambia, as well as of numerous smaller rivers. Very recent deposits are found in the Senegal and Gambia valleys and in that of the Middle Niger—regions liable to flood—while there are recent lacustrine deposits in the neighbourhood of Lake Chad. A considerable alluvial area stretches along the lagoon-fringed littoral between the Volta and the Niger delta—a great swamp district which divides the Bight of Benin from the Bight of Biafra—and in Sierra Leone. Large areas of red laterite occur in the higher parts of this region.

Long denudation has reduced this mass of old rocks to a comparatively low elevation, but its influence on the drainage is of the utmost importance. It sends the Niger flowing inland, and, by standing athwart the wet south-west winds, has led to the development of many coastal rivers. These are, however, of little value for communication. Those larger rivers that cross over it have their courses obstructed. The importance of this high area, too, in connexion with the drainage changes discussed in the first chapter is very great.

¹ Ground-nuts, maize, cassava, and tobacco were brought by the Portuguese from America

As waterways the rivers suffer not only from rocky obstructions, but from summer floods. The Senegal, whose mouth is almost blocked with sand in the dry season, is useful up to Kayes except from mid-April to mid-June, when all navigation is suspended. Small vessels can always use the lower 150 miles of the Gambia, and in the summer can reach the Barrakunda Rapids. The Niger (about 2600 miles long) has several navigable sections, of which the most important under favourable conditions are

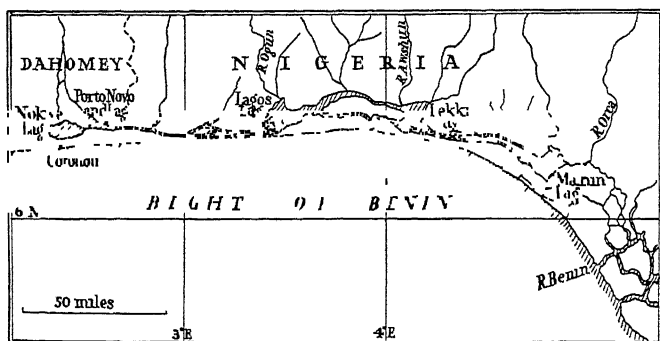


FIG 79. LAGOON- AND CREEK-FRINGED COAST WEST OF THE NIGER DELTA

A large-scale map would show a much more intricate network of waterways. These waterways are valuable for fishing and for local communication.

between Kurussa and Bamako, between Kulikoro and Niamey (more than 1000 miles), and below Jebba, while the Benue is useful in the wet season to above Yola, providing an important route to the Central Sudan. Other rivers of West Africa, including the Volta, have only a very limited value, but many creeks and lagoons, including the tributaries of the Niger, have considerable local importance.

Immediately south of Cape Verde the coast is characterized by a number of estuaries. The outstanding one is that of the Rokelle river. The fine harbour of Freetown, at the mouth of this river, and its position at the entrance to the Gulf of Guinea, have made it the nodal point of West African shipping. From here to the Cameroons the coast is marked by an extraordinary network of

sand-spits, lagoons, and creeks, broken only by sections of rocky coast in the neighbourhood of Cape Palmas and Cape Three Points. These lagoons are usually difficult to enter from the sea, but the network of waterways is of immense importance in the economic life of West Africa. The Guinea Current, in distributing land-waste along the coast, has caused a shallowing of the sea near the shore, resulting in a surf-bound coast that is a serious difficulty to shipping. Except where modern improvements allow

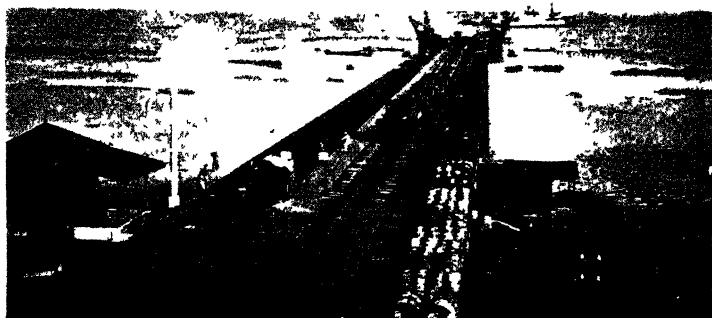


FIG. 80. WHARF AT COTONOU, DAHOMEY

Surf-boats are essential along some of the West African coast.
Elder Dempster Line

them to lie alongside quays ships must anchor beyond the surf, and goods must be loaded and unloaded by means of surf-boats.

Climate. Mean annual temperatures in West Africa for the most part do not vary substantially from 80° F. The lowest mean annual temperature is about 75° F, on the Senegal coast, where the Canaries Current has a slight effect, of the places for which records are available the highest is at Gao— 86° F. Those of Freetown and Akassa are 81° F. and 78° F. respectively, and the figures for Timbuktu and Dikwa are 84.5° F and 82.5° F respectively. But these figures disguise the big differences in annual range. Along the Guinea coast the annual range is from 4° F. to 6° F., at Timbuktu it reaches 23.5° F. There is a corresponding

difference in the daily range of temperature; night frosts in winter are not uncommon in the northern region. Along the coast the mean monthly temperature varies little from 80° F. throughout the year, whereas it varies from 71° F. to 94·5° F at Timbuktu and from 73° F to 95° F. at Gao. It is plain that, broadly speaking, the winter temperatures decrease and summer temperatures increase northward, and that northern areas experience excessive heat when the sun is overhead or nearly so. The mean monthly temperatures everywhere show a double maximum, except in the neighbourhood of Cape Verde, and in the north they are relatively close together—at Timbuktu in May and September. The temperature figures as a whole suggest that West Africa is unsuitable for European settlement, though some temperature relief is experienced in the higher regions, such as Futa Jalon and the Jos plateau.

The rainfall comes from the humid south-west air-stream that has passed over the South Atlantic and the warm waters of the Gulf of Guinea. When the vertical sun is north of the equator, and low pressure occurs over the northern limb of Africa, the rainy south-west wind penetrates to the borders of the Sahara, the precipitation decreasing towards the desert. The high edge of the plateau rim is a barrier that necessarily causes the heaviest rainfall to occur on the seaward side, and the special influence of the Futa Jalon plateau and the highlands of Nigeria is brought out by the rainfall map. There is a moderate amount of rain in Senegambia, rapidly increasing towards Sierra Leone and Liberia, remarkably decreasing in the Gold Coast area,¹ and becoming very heavy again in Nigeria. When the sun has migrated to the Tropic of Capricorn the dominant wind is from the north-east, giving a definite rainless season in the northern belt. Its influence, however, is relatively slight along the Guinea coast, where there is some precipitation in December and January (though only a very small proportion of the total rainfall), brought by the now weak south-west wind. It is clear that the coastal rainfall is broadly of the tropical monsoon type, though east of Sierra Leone there is a

¹ It has been suggested that the low rainfall here is due to the effect of an upwelling of cold water caused by the south-west winds blowing parallel with the coast where it bends to the north-east

double maximum, but the Guinea coast receives some rain in what is the dry season for the remainder of the area, so that its rainfall approximates to the equatorial type. The total annual rainfall for the following stations brings out the coastal conditions. Goree, 20 5", Freetown, 138"; Cape Coast Castle, 35", Lagos, 72", Akassa, 144". Examples of interior stations are Kayes, 29", Wagadugu, 32"; Kano, 33.5"; Timbuktu, 9". Much of the interior rainfall is of the thunderstorm type, and the amount varies considerably from year to year. Along the Guinea coast it is largely convectional, in heavy showers, often accompanied by thunder squalls.

What makes the climate of the Guinea coast so difficult for Europeans is the excessive humidity, which is relieved only when the dry and dusty harmattan blows from the east or north-east, reaching the coast intermittently during the dry season. This influence from the Sahara, dusty though it is, is locally known as 'the doctor.' The climate also favours the swamps, in which breed vast numbers of disease-carrying insects.

Vegetation. From a consideration of the latitudes and the distribution of rain in West Africa it might well be thought that the natural vegetation would include a belt of rain forest, a wide zone of savanna, and a northern margin of semi-desert character, with appropriate transitional vegetation between these main zones. Broadly speaking, this is so; but long human occupation has brought great changes, mainly because of the traditional African use of the land by which forest has been ruthlessly cleared (usually by the killing of trees with brushwood fires at the base) to permit new land to be cultivated when the old is exhausted. This so-called 'shifting cultivation' leads to secondary growth which may in time be cleared. Similarly in the savanna zone there still persists the annual firing of the grass (about October) so that over large areas only fire-resistant trees of a rather stunted character survive. In consequence, there remains to-day only a relatively small proportion of the original climax forest while much of the savanna zone is now degraded. The extent of the debasement generally is indicated by the fact that the oil-palm, the characteristic tree of the lowland forest of West Africa, is found as a 'relic' in parts of what is now savanna country.

Climate is the main determining factor in the fundamental distinction in West Africa between forest and savanna, and the rainfall element is specially important. The total amount of rainfall is clearly of much significance, but equally so is its distribution. The occurrence of a dry season tends to modify, and with increasing drought, to limit forest growth; but the degree of dryness indicated by the relative humidity of the air in the middle of the day during the dry season is also an important factor. Thus Ibadan has 48" of rain with a three months' dry season, a lowest mean monthly humidity at 1 P.M. of 49 per cent., and is in a region of high forest, Kaduna has an annual total of 52", a five-month dry season, a corresponding humidity of 15 per cent., and is in the savanna zone.¹

The lagoons and lower riverine districts of the Guinea coast are characterized by mangroves, which have an economic value for timber and tannin, while one variety in Nigeria is burnt for the sake of the salt in its ash. The rain forest has dominant, or emergent, trees of great girth, usually buttressed, rising up to 200 feet; these yield valuable timber, including varieties of African mahogany. The oil-palm is characteristic, and rubber-vines, gum copals, and the kola-tree occur. The native methods of forest-clearing have led to widespread deforestation; Sierra Leone has lost the bulk of its forests in this way, while in general, apart from limited areas of forest reserve, this zone is essentially agricultural, although, of course, very many trees are associated with and separate the farmed lands. It is important to notice that in the central portion of Ghana the amount of rain is such that a natural corridor of relatively open country leads from the coast to the interior, essentially a belt of wooded savanna, and spreads eastward into Dahomey. As the drought of the winter season increases northward a belt of more open monsoon forest ('dry forest' or 'mixed deciduous forest') with many deciduous types is reached, giving way to the typically deciduous savanna forest (where the shea-butter tree is of some importance), in which the general growth of grass gives an open aspect. Here the native land-clearing has greatly increased the area of grass-land. Trees become fewer and more capable of resisting drought and fire,

¹ *The Nigeria Handbook*

and grass prevails, giving way to thorn-forest and scrub-land, where stunted acacias are very typical and even the grass cover is seriously reduced. The regions beyond the forest present a parched appearance for a very large part of the year.

The savanna zone has been described as a sea of grass, with trees of generally small size having a twisted habit of growth due to fires and a corky fire-resistant bark. The more southerly part of it has 'relict forest,' with trees clearly belonging to the rain forest, indicating that these parts would support forest and that this vegetation is a debased one. French students of the subject make a three-fold division of the savanna:

(1) *Guinea savanna* with scattered tree-growth and long grass reaching from 5 to 8 feet in height during the rainy season, in the south it is a form derived from the former northern part of the forest zone with gallery forest along the rivers and relict patches away from them.

(2) *Sudan savanna*: a park-land type, with acacias common, the dom-palm, shea- and other trees including the baobab (which is cultivated), and shorter, less coarse, and less tough grass. Sometimes described as the 'donkey belt,' this type of savanna is usually well farmed.

(3) *Sahel savanna* with a good deal of well-spaced acacia and other woody growth and short grass 2 to 3 feet high, but with little continuous cover; it is green and fresh with the brief rains. Its debasement is thought to arise from overfarming and overstocking, and it merges into desert with scattered, small tufted bushes. The Sahel savanna is marked by the camel and pack-ox.

Development While the basis of the native population is Negro, there is a great variety of type and development. Primitive tribes remain in the highland areas to the north of Sierra Leone and Liberia and in the Jos region. True Negroes are chiefly found near the Guinea coast, and include the intelligent Kru seamen of Liberia and the Yoruba of Nigeria, who are good agriculturists. The Sudanese Negroes usually show a strong infusion of Caucasian blood, and include the Jolofs of the Gambia region, the Fula herdsmen of the Upper Niger, represented in Nigeria by the Fulani, who by the beginning of the nineteenth century had spread a Mohammedan empire over the greater part

of the Western Sudan, the agricultural Mandingoes, dwelling to the south of the Fula people, and the agricultural and trading Hausa of North-west Nigeria, the only race in West Africa to reduce their language to writing—the language in which so much of the internal trade of West Africa is carried on. Mohammedanism prevails throughout the Sudan; whatever view may be taken



FIG 81. THE VRIDI CANAL, IVORY COAST

This ship canal, two miles long, is a major improvement in West Africa. It provides direct access to the wharves of Abidjan. (See Fig 102.)

Service d'Information de la Côte d'Ivoire

of the value of this religion imposed from outside the region, there can be no question of the enormous difference made to West African culture by its penetration along the 'grass road' of the Sudan and from the north.

With the early trade that followed the Portuguese discovery of West Africa came the introduction of many commodities, important among which were tobacco, manioc (cassava), and the ground-nut. It is noteworthy that the most important coastal base for West African trade was the Gold Coast, a region in which, owing to the thinning of the forest zone, pressure on the Negroes from the north was very great and which provided a large proportion of the slaves.

The latter end of the nineteenth century saw the change of European policy from exploitation to development. As West

Africa is unsuited to white settlement, the policy of both French and British was directed towards stimulating the native as agriculturist, herdsman, and shepherd. In general, this was pursued without alienation of land or interference with tribal custom, although, of course, inhuman practices were suppressed.



FIG 82 TRADE SCHOOL, GHANA

Technical instruction provides one aspect of the educational work carried on.

Information Bureau of the Ghana Government

and slavery was all but eliminated. The British relied in the past upon what is known as *indirect rule*, which involves administration through the existing tribal authorities and the maintenance of tribal law and custom, the official functions being largely of a helpful and advisory character. The territories have been separately administered, with the principles of government in general in accord with the responsibilities of a trusteeship under the United Nations. Recent years, however, have seen important developments. District councils became the 'native authorities' through which administration worked and African participation in government was encouraged. The Gold Coast became independent Ghana in 1957; Nigeria, a federation of three self-governing regions, followed in 1960; Sierra Leone became independent in 1961. In the Gambia indirect rule as generally practised is much modified. In brief, this means that

Africans are administering or helping to administer their lands along lines associated with what are called the 'western democracies'. The French method was that of *direct rule*, under which the various territories were controlled, under a Governor-General, from Dakar, and administration worked largely by decree, through a hierarchy of officials, many of whom, however, were Africans. This system was much modified even before 1958, when under a referendum Guinea secured independence, and the other territories became republics (now with independence), within the French Community. Whatever the method of government, economic development has proceeded by the improvement of native crops and domestic animals, the introduction of new products, the control of diseases affecting man, animals, and plants, agricultural education, the exploitation of minerals, and the provision of modern communications. The African has needed to modify his traditional habits and methods, serious handicaps both to subsistence and commercial production, though changes once under way can spread rapidly. In this connexion may be noted the large number of co-operative societies—mainly for production and marketing—that now exist.

Traditionally farming has proceeded on the basis of 'shifting cultivation' in both the forest and savanna zones. This derived from the fact that soil, in the absence of the use of manure or fertilizer, rapidly loses its fertility, especially as the hoeing-stick does little more than scratch the surface. After a year or two new land must be used, and the old reverts to secondary growth. In time this may be again used, but where population pressure is great (as in parts of Sierra Leone) it lies fallow for too short a time properly to recover. When the farmed lands or 'gardens' in use are far from the village the village itself may be moved. The modern view of shifting cultivation in areas in which population pressure is not too great is that it is a wasteful but probably necessary reaction to the prevailing conditions. Other terms are now often employed to describe it, especially in its less extreme forms, in particular 'forest fallow,' 'bush fallow,' 'reclearing'. It is pointed out that the secondary growth is 'forest fallow' used as a rotation, and if the fallowing is long enough, while the system may be a wasteful use of land, it is a sound one for the African.

farmer, having regard to the conditions. Moreover, the system avoids serious soil erosion. In large areas of the forest zone, *e.g.*, in parts of southern Nigeria, a reasonable balance has been struck, and villages tend to be stable where formerly they were shifted from time to time. Improved farming techniques provide the solution to the problem, especially if commercial crops are contemplated. In the grassland zone, where cattle have traditionally so much importance, overstocking is widespread, assisting with the annual firing to promote soil erosion. The firing of the grass is much less prevalent than formerly, no doubt as a result of the efforts to spread knowledge of the better use of land.

Against this background of primarily subsistence farming it is remarkable that in modern times new crops have been established and the commercial production of some has reached important proportions. In the forest zone special attention has been directed to the oil-palm and cocoa, and to cotton in certain areas. The difficulties are well illustrated in the case of the oil-palm. Young fruiting stems are tapped and whole trees felled for the native drink, palm wine.¹ The expressing of the palm-oil (which is obtained from the mesocarp, the fleshy part of the pericarp, and is different from the palm-kernel oil) is too often done by primitive methods—in some districts by treading. West African oil is still often poor, though the general standard is rising. Moreover, the need for the cultivation of better varieties remains in many cases urgent—in Sierra Leone, for example, the principal varieties have a pericarp very poor in oil. Competition from the Congo² as well as from plantations in the East Indies and Malaya, where a high-quality oil is obtained from a variety possessing a pericarp very rich in oil, has to be met. In all these matters it may be said that great progress has been made. Cocoa can suffer from careless fermentation, but the harmattan (which sometimes has a too desiccating effect upon the growing tree) favours the drying process after fermentation, especially in Ghana. Rubber was once an important element in the export trade of West Africa; rubber

¹ This habit has tended to increase with Government attempts to reduce imports of European spirits into British West Africa.

² The growing production of cheap vegetable oil in West Africa and other parts of the tropics has a far-reaching effect inasmuch as it has caused a decline in olive cultivation in many Mediterranean lands.

production elsewhere and the success of cocoa have combined to restrict the output

In the savanna zone, mainly under French supervision, great attention has been given to ground-nuts, cotton, and cattle. The Government often carefully distributes ground-nut seed. Varieties of cotton adapted to the climatic conditions (American in rain areas, Sakel for irrigation conditions) have been introduced, and suitable seed distributed, native types also being encouraged. Vaccine stations have been established for dealing with epizootic cattle-diseases, and attempts—not very successful—to introduce merino sheep have been made. It is significant of change that officially-run experiments in mechanized or semi-mechanized farming are on the increase in these lands.

In the wetter zone native crops include coconut, banana, piassava,¹ maize, yams, cassava, ginger, kola-nuts, and rice. In the savanna zone millet is the characteristic crop; others are Guinea corn (a type of millet), beans, cassava, sweet potatoes, shea-nuts, and castor oil, cattle, both straight-backed and zebu, are of great importance, and the villages are protected by stockades owing to the presence of lion and leopard. On the borders of the Sahara irrigation is essential for cultivation, dates are grown, flocks and herds are kept, and the horse, if not found in large numbers, is of great importance, as also are asses. The northern zone is characterized by walled cities and mud houses—in strong contrast with the thatched huts that prevail to the south. It is important to notice that the West African farmer is still essentially a hoeman, as in the time of Mungo Park, and does not often take to ploughing. Fishing is an important occupation in the lagoons of the Guinea coast, much fish is sun-dried and exported up-country, while sea fisheries have been developed in the west of the region. Salt is obtained by evaporation along the coast, and deposits occur in some inland districts.

The development of mineral wealth is best dealt with in connexion with the political divisions. Railways and roads have been primarily developed to serve the needs of the political areas, con-

¹ The raffia-palm of the swamp lands yields poles from the long mid-ribs of the fronds, and piassava—a stiff fibre used for brooms—from the beaten stems. Woven sleeping-mats and baskets are made from the leaves.

tinuous navigation on the rivers is not available. One noteworthy development was the short-circuiting of the Sudan by the French, who utilized the navigable Middle Niger and the railway from Kulikoro to Dakar. This not only permits the export of the ground-nut crop after the harvest, when the rivers are low, but takes away from more southerly areas trade that might be expected to pass through them from the otherwise somewhat isolated interior regions.¹



FIG. 83. YAM HEAPS ON AN EXPERIMENTAL FARM,
GONJA, GHANA

The heaps are required for the development of the large root. The Gonja experimental scheme, about 60 miles west of Tamale, is concerned with investigating the possibilities of simple mechanization.

Central Office of Information

GHANA

Ghana became a republic within the British Commonwealth in 1960. Its administrative divisions are the Western and Eastern Regions in the south, Ashanti in the middle, the Northern Territories and Trans-Volta-Togoland (previously a British trusteeship). The total area is about 92,000 square miles, with a popula-

¹ The extent of the changes in West Africa may be realized by reference to *West African Studies*, by Mary Kingsley (1899)

tion of nearly 5 million, of whom more than half are in the Western and Eastern Regions; there are only some 7,000 non-Africans. The Northern Territories form broadly a Moslem area of rather more than a million people, they belong to the savanna zone and have been rather isolated from the striking developments that have taken place farther south. Among many tribes the Fanti of the south and the Ashanti of the middle zone (both Akan Negroes) may be mentioned. A very prominent physical feature is the Black Volta, which cuts across the middle of the territory, receiving the White Volta from the north and the Afram some distance above the point at which the Volta navigation is obstructed. West and south of the Afram there is a dissected highland reaching up to 2000 feet, receiving the heaviest rain and sending the Ankobra and numerous other rivers to the sea; this region carries the densest population. North of the Afram are thinly populated plains liable to inundation, but the density increases again on the uplands of the north-west, north, and north-east of the area. The coast has no estuaries, and its surf is a serious drawback, only partially obviated by a long breakwater at Accra, and emphasizing the importance of the artificial harbour of Takoradi.

Climate and Crops. A notable feature of the climate is the relatively small rainfall in comparison with the Guinea coast generally, especially round the Volta, although the coast belt in the extreme west has a high rainfall. Accra's total is only 27.4". This relative deficiency of rain, combined with former reckless forest-clearing and the encroachment of bush and savanna conditions, might have serious results, especially on cocoa cultivation, except that forestry activities are directed towards providing sufficient reserves for the maintenance of the water-supply and the humid conditions upon which the major agricultural industries depend. The success of cocoa-drying largely depends upon the strength or weakness of the harmattan—a weak harmattan may lead to imperfect drying after fermentation. The principal high forests are in the south-west; they are bordered by forests containing deciduous types, and merge in the interior and the east into open savanna forest. The wetter forest contains mahogany- and kola-trees, and there are limited areas where the oil-palm flourishes. The success of cocoa has greatly depressed the oil-palm

industry, and rubber-collecting—once important—is now very rarely undertaken

Cocoa, introduced from Fernando Po in 1879, has been a phenomenal success. The first export was 80 lb. (£4 in value) in 1891, but it now amounts to an annual average of about 240,000 tons, more than a third of the world production. Quality

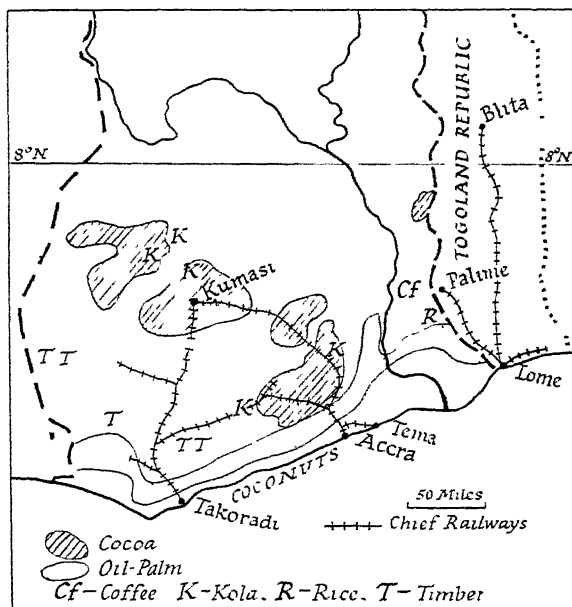


FIG. 84. GHANA—IMPORTANT VEGETABLE PRODUCTS

has been improved, and the important drying process is fairly satisfactorily done. This enormous production by African farmers, mostly in plantations of under 6 acres, is the most striking development in tropical cultivation in West Africa. A virus infection giving rise to the 'swollen shoot' disease is being controlled by the drastic cutting out of infected trees, and the loss has been partly offset by increased planting of heavy-yield types in Western

Ashanti Migrant labour from the north is needed especially at harvest time. A promising development has been the growth of co-operative cocoa-growers' associations.

While cocoa dominates as a crop in the wetter areas these have other important resources. The timber trade of the south-west has assumed considerable proportions; extraction is mechanized, and there is a number of sawmills. The chief varieties are mahogany, wawa, and sapele, the first being the most valuable timber; and while some is exported in the sawn form much is



FIG 85. EXTRACTING MAHOGANY, GHANA

Central Office of Information

sent away as logs. The formerly important kola-nut trade with Nigeria is dead, and the small export to-day is northward. As in Sierra Leone, the export of palm-kernels is greater than that of palm-oil; most oil is still extracted by hand. A little piassava and copal are produced. In order to diversify agriculture, encouragement has been given to the cultivation of limes in the Cape Coast area, of coconuts in the south-western coastal strip—there is some export of copra—and of bananas, which crop is becoming established. There are a few small rubber plantations; *robusta* coffee is grown in the south-central Togoland area. The

usual African food crops, notably yams, cassava, and maize are raised, and fishing in the coast zone and along the Lower Volta is important—some 8000 dug-out canoes and 50,000 men are employed in this work. Much fish is smoked or salted and dried for the Ashanti market

Ashanti is a territory rich in timber and cocoa; savanna begins in the north of it and spreads through the Northern Territories. Here are most of the cattle, sheep, and goats, though the numbers are not very large. West African humpless cattle predominate, but the zebu type is also found, and as a result of veterinary services, the numbers have greatly increased. Pigs, horses, donkeys, and poultry are also kept. The crops are chiefly Guinea corn, millet, maize, and ground-nuts, and attention is being given to the production of shea-butter (for cooking, lighting, and anointing the body) from the scattered shea-trees. Beeswax is collected, and cotton and tobacco are grown for local needs. Through its agricultural services the Government is encouraging mixed farms with bullock cultivation as well as anti-soil erosion measures.

Minerals The mineral wealth is considerable. Alluvial gold has long been worked, and some is obtained to-day by dredging along the Ankobra river. Most gold, however, comes from modern mines (the deepest shaft goes down to 3700 feet) in the neighbourhood of Tarkwa, Obuasi, and Prestea. Three-quarters of the diamonds produced are of industrial quality; they are obtained from surface workings in the Kade and Bonsa districts; about half the output is won by African 'diggers.' The production of manganese ore, averaging nearly $\frac{3}{4}$ million tons annually in recent years has placed Ghana second to the U.S.S.R.; it chiefly comes from Nsuta a few miles south of Tarkwa. Bauxite is exploited at present only in the Awaso district, west of Obuasi; further large resources exist in Ashanti. Mining employs about 1000 Europeans and 40,000 Africans.

Industrial Development. This is encouraged by the Industrial Development Corporation. A leading industry is sawmilling; veneers and furniture are made while cocoa-butter, palm-oil, and lime-juice are processed. Other typical activities include brewing and soap-making at Accra, shirt-making at Sekondi, cigarette-making at Takoradi, and biscuits at Kumasi. Development of a

more substantial type is planned. Much is hoped from the scheme, now in its early stages, to harness the Volta river at a point below the Afram junction for the smelting of Ashanti bauxite and possibly to provide for irrigation in the Accra plain. The scheme

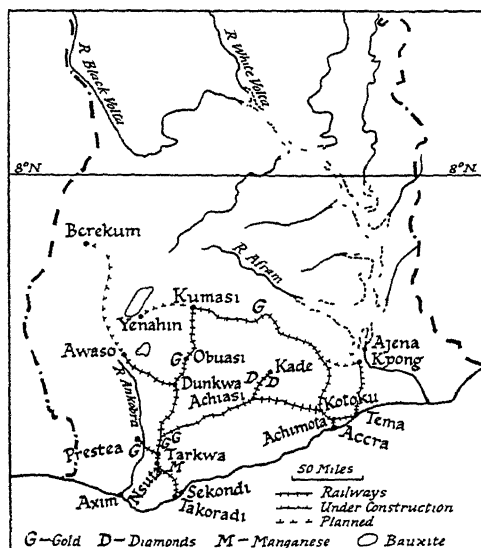


FIG 86 GHANA—MINERALS

A dam near Ajena is planned which will create a lake of the extent shown by the dotted line. An aluminium smelter at Tema is also planned.

involves new railway construction, some of which is completed, and the construction of the new port, Tema, which should be ready for full use in 1961.

Towns and Communications Until the opening, in 1928, of the deep water harbour at Takoradi, a few miles south of Sekondi, overseas trade had depended on surf-boats and a few jetties. Local granite was quarried for its huge breakwaters, and direct loading facilities are available. Mining development—notably manganese—led to its establishment, as it did to the construction of important railway lines. Takoradi (with Sekondi, 50,000 people) has had its harbour extended, it loads cocoa, timber,

manganese ore, and bauxite, handling over 90 per cent. of the exports of the country and nearly 60 per cent. of the imports. Ghana urgently needs another modern harbour, hence the

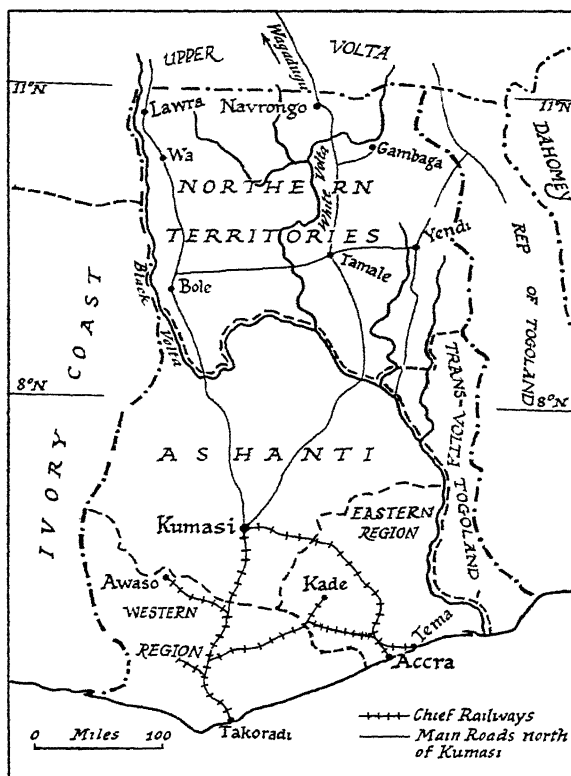


FIG 87 GHANA—POLITICAL

building of Tema. Other ports are Accra, Cape Coast Castle, Winneba, Saltpond, and Half Assini, the first being most important. Axim exports timber. Accra (150,000) has, like other towns, grown rapidly, it is the capital, has a few factories, and is an important educational centre with the University College near by.

The chief interior town is Kumasi (with suburbs, over 80,000 people), the important rail and road junction of Ashanti, in the heart of the cocoa country. It has considerable administrative functions and a technical college. The Northern Territories are administered from Tamale (17,000), now an important road-centre much concerned with agricultural and veterinary services.

The railway system (3' 6" gauge) is confined to the south of the country and is simple, with main lines connecting Accra and Takoradi with Kumasi and a growing number of branch lines and connexions. From Takoradi to Tarkwa the line was double-tracked when the single line could not cope with the growing traffic; from Huni Valley a little beyond Tarkwa an important line goes to Kade and Accra, and from a point north of it a branch serves the Awaso bauxite production. Important connexions are being established from Tema, and a line to serve Ashanti bauxite may well soon be needed. A considerable system of roads motorable for most of the year has been built up in the south, where important ones are tarred. River transport is not important.

Accra is an international airport; other airports are at Takoradi, Kumasi, and Tamale.

Health, educational, housing, and other social services are expanding, and a vigorous policy of economic development is being planned. The establishment, under Government auspices, of the Bank of Ghana is a mark of confidence in the future. Stability, however, at present depends largely upon the maintenance of good markets for cocoa.

The former British Trust Territory is now an ^{integral} part of Ghana. The northern two-thirds, with the small road centre of Yendi, is administered from Tamale. There is some production of cocoa, coffee, and palm products in the south; rice and tobacco are grown for local needs, and there are home crafts connected with mat- and cloth-weaving and pottery. Some of the small trade goes through the adjacent Togo Republic.

Trade. The *per capita* trade of Ghana is larger than that of any other tropical African territory. The United Kingdom is both the leading supplier and customer. Cotton piece goods, partly from the United Kingdom, dominate the imports; motor vehicles, chiefly commercial, come next but far behind. Machinery,

especially mining machinery, is a considerable import, as also are cement, tobacco, flour, and sugar. Many miscellaneous manufactured goods are imported—bicycles, sewing-machines, radios, and the like—which illustrate changes in social life. Cocoa, sent chiefly to the U.S.A. and the United Kingdom, provides perhaps two-thirds of the export values; gold and



FIG. 88. MAHOGANY LOGS

Information Bureau of the Ghana Government

diamonds are sent to the United Kingdom, as is most of the bauxite; manganese ore goes largely to the U.S.A. and the United Kingdom, as does the timber export. West Germany and other European countries take a significant share of the exports.

BRITISH WEST AFRICA

Until a few years ago four territories, each with a separate administration supervised by the Colonial Office, made up British West Africa. They were the Gambia, Sierra Leone, the Gold Coast (now Ghana), and Nigeria. The developments that have been described on page 199 have reduced British West Africa, now

that three have become independent countries, to the territory of the Gambia. This is a small territory with a highly arbitrary boundary, small resources, and a small population politically cut off from neighbouring peoples of similar race and culture. It is difficult to see how the Gambia could maintain an independent status.

Sierra Leone, Ghana, and Nigeria are full members of the British Commonwealth of Nations.

The political changes have been paralleled by social and economic changes. While illiteracy remains widespread education is affecting increasing numbers of Africans, and the existence of a number of colleges of university status as well as of technical schools and training colleges for teachers means that literacy will spread and that the African will increasingly share in administration and development. On the economic side the small oil-press and the large oil-mill have made their appearance, and installations for handling palm-oil in bulk have been set up. Logging is largely modernized, the use of motor transport is rapidly growing, a number of processing and other factories indicate a small beginning with industry, while development schemes—some large, some small—show that economic expansion as well as social advancement is envisaged. Indeed, the three independent countries are vigorously pursuing a policy of industrialization while expanding education and training technicians, administrators, and teachers. At the present time a considerable number of British personnel who served the Colonial Office administration remain to serve the African Governments but their numbers are bound to decline.

A feature of the modern economic organization has been the establishment of marketing boards for the principal products. Thus the Gambia has its Oil Seeds Marketing Board, and both the Regions and the Federation of Nigeria have boards for several commodities. In general, these boards buy the products at a fixed price and market it; they aim at building up reserves to maintain reasonably stable prices for the producers with a view to smoothing out price fluctuations, which have been a very disturbing feature in the past. The boards can also do much to stimulate higher quality and improved methods of production.

The Gambia

The total area approximates to 4000 square miles, with about 295,000 inhabitants, including Jolofs (Wolofs), Fula, and Mandingoes, and about 400 whites. The important part of the Colony, which covers about 150 square miles and includes Maccarthy Island in the Middle River with Georgetown, is an area of 30 square miles at the mouth of the river, which includes the 4 square miles of St Mary's Island on which stands Bathurst, the capital.

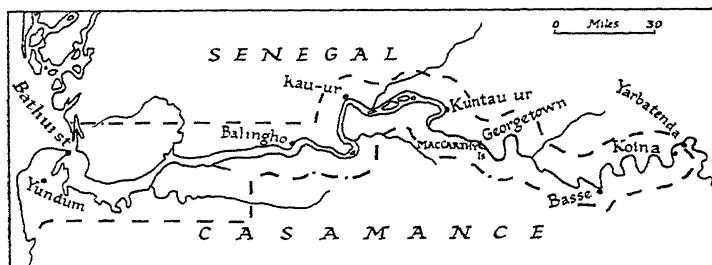


FIG 89 THE GAMBIA

The remainder of the Gambia is a protectorate. The whole forms little more than an *enclave* in Senegal, owing to the neglect of British interests at a period in the nineteenth century when French policy was active in West Africa. The boundary based on the banks of the winding river is an illustration of the many arbitrary and unsatisfactory divisions in Africa.

The narrow strip of territory, savanna in character, stretches from the coast to the Senegalan river-port of Yarbatenda. The river, which rises in the Futa Jalon, is tidal through most of its length within the territory. From June to October is the hot, wet season. Conditions are pleasanter in the dry season, and the climate generally has been described as the best in British West Africa. Trees include mahogany, oil-palm (with small heads and small fruits), and rubber, while piassava grows wild in the swamps; but these have little importance. Bamboos grow along the river-banks. Away from the river there is savanna country. Cattle do well except in swampy districts where the tsetse fly is

common. The natives depend upon such crops as rice (grown in swampy districts), Guinea corn, millet, maize, and cassava. Away from the riverine swamps and alluvium the soils are light and sandy, well suited to ground-nuts which form the cash crop and on which is concentrated the major agricultural effort; yields generally are, however, rather low owing to soil impoverishment through overcropping. The major part of the crop comes from above Maccarthy Island, where Kuntau-ur is the chief shipping port. It comes by head-load and lorry to the river, along which it is transported by power craft or lighter, or, in the Bathurst area, by sailing-craft. December to January is the exporting season when ships occupied in summer in the Baltic timber trade pick up the crop. This is exported chiefly in the shell, as little machine-decortication takes place, though a beginning has been made with oil extraction. The export averages some 55,000 tons annually, and it could hardly be produced by the small population, whose work is supplemented by that of migrant farmers from Senegal ('strange farmers'), in recent years averaging some 17,000 annually, who enter the territory in summer, rent land, and share the crop with the landlord.

The dependence of the Gambia's economy upon a single crop clearly indicates the need for diversification of production. Some attempts to establish new products on a commercial scale (cotton, eggs) have not been successful. There is an experimental farm at Yundum, 17 miles south-west of Bathurst. Considerable reserves of ilmenite have been located south-west of Bathurst but their working proved uneconomic.

St Mary's Island forms the tip of a line of sandbanks projecting eastward into the river mouth, and which border a considerable tract of mangrove swamp. The built-up area of Bathurst¹ (20,000 people) now covers most of the island. The town has a deep-water wharf and, at Yundum, an airport. There is a depth of 24 feet of water constantly available at the port, and small ocean-going vessels can reach Kuntau-ur, the chief up-country trading-station, about 150 miles above Bathurst. Small collecting- and trading-stations are frequent along the river. There is no railway—indeed,

¹ The Gambia was the first British slaving area, and trading companies were established here in the time of the Tudor Queen Elizabeth

a railway is superfluous, as small boats can use the whole length of the river in the colony. The river floods in the rainy season, there being a 30-foot rise at Georgetown.

Trade. The trade of the Gambia is necessarily rather small. Cotton piece goods form the chief import item—up to a quarter of the total value—and there are small imports of hardware and miscellaneous manufactured goods and of materials for the maintenance of transport services. Rice, sugar, and kola-nuts (from Sierra Leone) are other significant imports. About 95 per cent. of the exports are provided by ground-nuts in shell which go generally to Western European countries. Palm-kernels and hides and skins account for nearly all the rest.

SIERRA LEONE

This country, with independence in 1961, covers 28,000 square miles. The original 'Colony' (including the Sierra Leone peninsula, with Freetown, and Bonthe on Sherbro Island) covers 269 square miles. The population much exceeds 2 millions, and consists (except for about 1000 Europeans, most of whom are in the 'Colony,' and 2000 Asians) partly of 'colony Africans,' the descendants of liberated slaves brought there in 1787 and subsequently, but mainly of native tribes including some Fula and Mandingoes. The area rises towards the Futa Jalon in the north-east, where the granite hills reach 6000 feet; the plateau generally has an average elevation of about 1500 feet. The trend of the coast and high land is at right angles to the south-west wind, which brings heavy rain from May to October. There is little fall from December to March, when the average relative humidity falls below 50 per cent. Along the coast the contrast should be noted between the Turner's peninsula with its straight coast and long lagoon and the rest of the coast belt, which is mostly flat and low-lying, with its many estuaries. Many short rivers, including the Great and Little Scarcies, the Rokel, and the Taia, run from north-east to south-west, and are rapidly silting the creeks and estuaries of the coast, so that as the mangrove swamps follow the advancing land, deltaic land, ideal for rice-growing, remains. Wasteful clearing in the past has reduced the rain forest very considerably, and much has degenerated to

low bush and scrub, so that forestry is now an important Government concern. Savanna woodland occurs in the highland districts of the north and north-east, where the rainfall declines to below 100 inches.

Productions Forestry is not very important, as comparatively little original forest remains owing to encroachment upon it by the increasing population, there is, of course, a good deal of secondary cover of little commercial value. What remains of the original forest is largely in broken hill country where extraction is difficult. Piassava is plentiful in the south-east coastal margins.

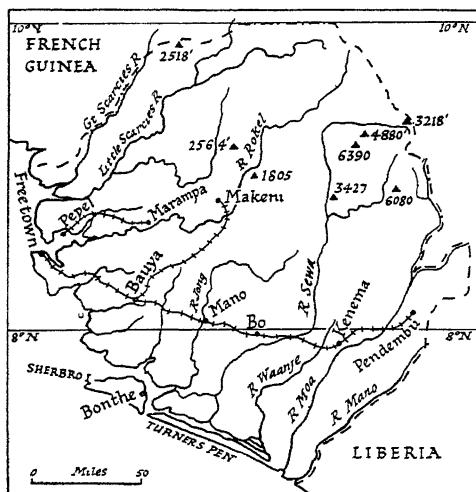


FIG. 90. SIERRA LEONE

The oil-palm is found over some three-quarters of the country, over large tracts in the north-east and east it is wild and abundant; and only slowly in these relatively untouched areas where head portage is essential are roads being developed. Most production comes from round the villages in the lower lands, into which have been introduced better varieties based on the work of a research station, the native ones have mostly a thin mesocarp yielding little oil. Palm-oil yield still remains low in relation to palm-

kernels—so small, in fact, that sometimes its export is controlled to maintain an adequate home supply. There are several small modern palm-oil mills. The following table (covering a period of two years) contrasts Sierra Leone and Nigeria as exporters of palm-oil and palm-kernels

—	EXPORTS OF PALM-OIL	EXPORTS OF PALM-KERNELS
Sierra Leone	15 tons	57,645 tons
Nigeria	175,720 „	428,634 „

Also of export importance are kola-nuts. The kola-tree grows wild, but is also cultivated round every village, and is reported to be the best variety in West Africa. Great attention is being paid to other crops. Rice is the staple food, and has long been grown as an upland crop, but great attention has been given to swamp rice and to the use of earth-moving equipment for empoldering suitable swamp land, notably in the south-west of the country. The production is expanding, and there are a few rice mills. The poor native ginger rhizome has been improved and is being more carefully prepared, but there appears to be no large market for this product. Cotton has long been carelessly grown, and long-staple varieties have been planted in the Bauya district, but there is no notable production. Cocoa now seems well established in the south-east, where a beginning has been made with coffee cultivation. On the sandy littoral coconuts are cultivated, and plantations of bananas and citrus fruits have been made. Maize, yams, sweet potatoes, cassava, red pepper, chillies, and mangoes are grown, and gum-copal and beeswax are collected. Of these many products the most promising from the export point of view is cocoa. Ground-nuts are confined to the north of the Protectorate, where a humpless breed of cattle, immune to trypanosomiasis, is raised, though the number is not large. A few sheep, goats, and pigs are reared.

The mineral development has attained substantial importance. The production of hæmatite iron ore at Marampa has reached important proportions: a private mineral railway takes it to a

pier at Pepel for transport abroad. Farther east are the Tonkolili deposits, the opening-up of which is planned. Recent years have seen a very significant production of diamonds and a notable output of chrome ore.

Small industrial beginnings are indicated in the form of saw-milling, rice-milling, and soap-making.

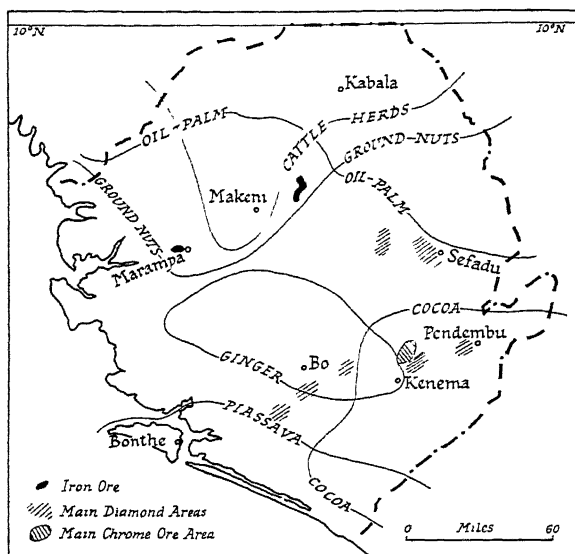


FIG. 91. SIERRA LEONE—IMPORTANT PRODUCTIONS

Southern limits of cattle and ground-nuts, northern limits of oil-palm and piassava

Towns. Freetown (90,000 inhabitants) has the best natural harbour in West Africa, and is the focus of West African shipping. Vessels of 32-feet draught can use the deep-water quay. Freetown does the bulk of the trade, but Marampa iron ore passes through Pepel. There is a hill station at about 900 feet. The Lungi airport lies on the other side of the estuary from the town. The Rokel river has a navigable lower course leading to Freetown, while the waterway between Turner's Peninsula and the mainland, into which a number of rivers run, leads out to Sherbro

Island, with the once important but now dormant port of Bonthe. The 2' 6" gauge, single-line Government railway, the first British West African line, runs from Freetown to Pendembu, with a branch from Bauya to Makeni; it is fed by a considerable number of motorable roads

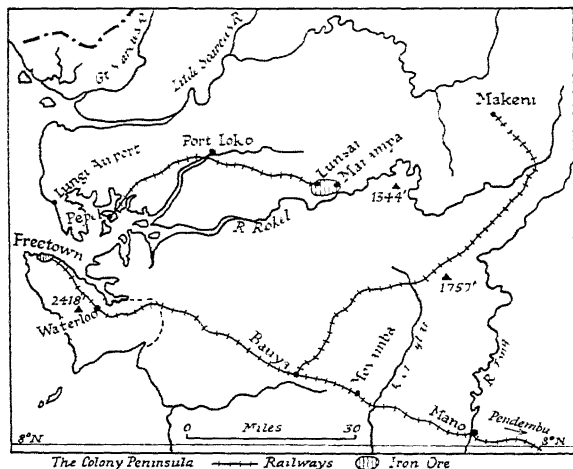


FIG 92. THE POSITION OF FREETOWN

Trade Owing largely to expanding mineral production, the trade of Sierra Leone has considerably increased. Cotton piece goods from the United Kingdom, India, and Japan form the largest import, followed by iron and steel goods. Sugar is the principal food import. Apparel, electrical apparatus, oils, motor vehicles, and a large variety of manufactured goods are imported, and suggest the modern influences that are at work. Iron ore and diamonds provide the chief export, usually three-quarters of the total export value; they are followed by palm kernels. Lately cocoa has shown a considerable advance; coffee, chrome ore, ginger, ground-nuts, and piassava provide most of the rest. Rice and bananas may both figure in the exports. Nearly 80 per cent. of the trade, both import and export, is with the United Kingdom.

NIGERIA

Nigeria is a federation of three regions, each responsible for many services locally, but with a central administration at Lagos (which is federal territory) responsible for services, such as railways, customs, law, of general importance. The considerable measure of regional autonomy derives largely from the existence of powerful Mohammedan emirates in the Northern Region traditionally somewhat out of sympathy with the peoples of the forest zone in the south. The administration of the Cameroons Trust Territory, itself divided into two parts, was partly integrated with that of Nigeria until the Federation became independent in 1960; the southern part was in effect a Region within the Federation, while the rest was linked with the Northern Region. The last enumeration of the population in 1952-53 showed (including the Cameroons area) a total of over 31 millions, shared as follows

	AREA IN SQUARE MILES	POPULATION
Northern Region	281,800	16,813,000
Eastern Region	29,500	7,250,000
Western Region	45,400	6,132,000
Southern Cameroons	16,600	743,000
Total	373,300	31,200,000

Except for Algeria proper, Nigeria is the most densely populated country in Africa, with a larger population (some 34 million in 1960) than that of any other African territory. The population is, however, far from being uniformly distributed, for while some tracts have fewer than 10 persons to the square mile, the density exceeds 500 to the square mile in the Udi district, east of the Lower Niger, where pressure on the land is severely felt. The Kano area is also densely populated, and other considerable concentrations are found in the Ibadan and Sokoto areas. The growth of towns, especially in the south-west of the country, has been remarkable—there are seven of over 100,000 inhabitants—though it should be noted that towns in the forest zone are normally sprawling collections of large villages. Ibadan's population approaches half a million.

In the south are pure Negro tribes, of whom the Yoruba are specially important. These have a relatively advanced culture, and their country contains several large native towns, including Ibadan. The Fulani (Fula) and Hausa of the north show considerable Hamitic admixture. This region is a stronghold of Mohammedanism, the influence of which has so spread that half the inhabitants of Lagos profess this religion. The Fulani are still largely nomadic pastoralists, the Hausa are traders and

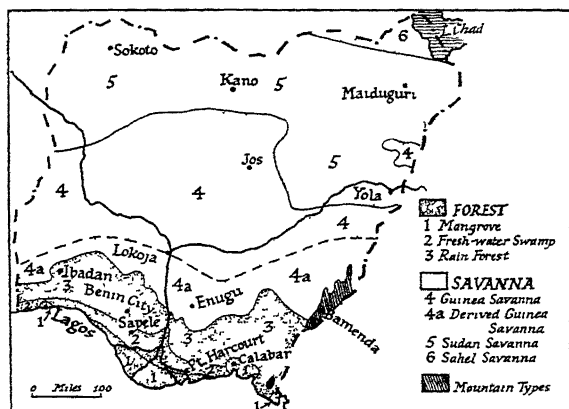


FIG. 93. NIGERIA—VEGETATION

cultivators, while the Kanuri of Bornu are agriculturists and herdsmen. The numerous tribes of the Jos region and surrounding areas are more backward, and present a difficult administrative problem. The very numerous Ibo people are active agriculturalists, so much so that soil erosion on the Udi plateau has attained serious proportions, and many Ibo people migrate far afield in search of employment. In the forest belt there are many tribes with pagan traditions, though Christianity has greatly spread in this area.

Broad lowlands, including the Niger delta, lie near the coast, fringed by lagoons that form an almost continuous waterway. The lowlands penetrate up the Niger and Benue, broadly dividing the country into three main blocks of upland, the largest, in the

north, including the extensive Jos plateau with much land well over 3000 feet. The smallest block is the Udi plateau, east of the Lower Niger. Much greater heights are reached in the Cameroons strip, where a little volcanic activity survives. The Niger and Benue are navigable in the rainy season up to Jebba and Yola respectively. The Benue and Cross rivers have considerable local importance, and the Kabi and Yobe are of value in a relatively dry area, the latter draining to Lake Chad.

Climate and Vegetation. The climatic conditions are typical of West Africa, with gradual changes in temperature and rainfall northward towards the arid interior. The rainfall of the southern part of the country, which increases eastward, is much heavier than that of Ghana, and on the seaward side of the Cameroon Peak reaches nearly 400" per annum. The angle of high land formed here by the Gulf of Guinea, and into which blows the prevailing south-west wind, is largely responsible for this.¹ Lokoja has nearly 50" and Kano 33·5".

The general description of the vegetation zones of West Africa given earlier in this chapter applies to Nigeria. In the south are large tracts of mangrove and fresh-water swamp forest followed by rain forest with tall emergent trees and spreading in somewhat modified form up the slopes of the Cameroon highlands. In the north of this zone the effect of the dry season shows itself in the occurrence of deciduous forms, and this part of the forest is often described as 'mixed deciduous forest' or 'dry forest.' Then comes savanna in its various forms—at first derived Guinea savanna with relict patches of forest, then Guinea savanna proper with its trees and long grass, followed by the great areas of Sudan savanna, and finally a tract of Sahel savanna towards Lake Chad. The high part of the Jos plateau is mainly degraded Guinea savanna, and on the higher parts of the Cameroon highlands are special forms, including much short grass.

Comparatively little of the rain forest remains, and some 9000 square miles of forest reserve represent all that is left of the original forest. The rest is "honeycombed with farms and villages," but, of course, there is much tree and other growth of a secondary character as well as many trees characteristic of the forest proper.

¹ Compare the heavy rainfall in the mountainous angle of North-east India

The 'bush fallowing' that prevails has reached such a stage that it is inappropriate to apply the term 'shifting cultivation' to the type of land use, which, in fact, does not encourage soil erosion except in such areas as the Ibo lands of the Udi plateau, where population pressure is great and the fallowing period too short.

In the mangrove swamps are varieties of mangrove which yield tannin from their leaves and bark, besides logs used for railway sleepers. The rain forest contains African mahogany and other timber trees, notably iroko, oil-palms, rubber-vines, and gum-copal, as well as the important kola-tree. The Cross river district is important for mahogany and ebony, while there is some export of rubber. Mahogany is also found in the monsoon or mixed deciduous forest. The Sudan savanna is marked by the shea-butter-tree, and gum-acacias appear in drier areas, where the Sahel savanna may be almost described as semi-desert. The Northern Region has millet, ground-nuts, cotton, cattle, donkeys, and goats as typical products, the grass being an important factor in the economy.

It has been suggested that the desert is encroaching upon the savanna in the north. The Yobe seems to be bringing down less water than formerly, and the area flooded by Lake Chad is decreasing (p 256). Further evidence is offered in the migration of villages southward in Bornu, the region by Lake Chad. It is, however, now thought that the annual firing of the grass and overgrazing with accompanying soil erosion are mainly responsible for this. Well-water is, however, available in this region, and irrigation is common; the Egyptian shaduf is still used here.

Productions The vegetable and animal products of Nigeria are those common to West Africa. Nigeria is the outstanding producer of palm-oil and palm-kernels, particularly the former, and these largely come from plantations established by African farmers, more notably in the Eastern Region where farmers, the Government, and marketing firms have co-operated. (Some rubber plantations have been established on similar lines) The quality of the palm-oil is steadily rising with the development of oil mills and the refusal of the Marketing Board to buy low-grade oil. Palm-oil is now collected in bulk installations at the ports preparatory to export. The western districts export a far smaller

proportion of palm-oil in comparison with palm-kernels than do the eastern, where varieties with a thicker pericarp flourish. An important by-product is 'palm briquettes,' sold for fuel, and made from the fibrous pulp and shell. As a producer of cocoa, chiefly from north of Lagos, Nigeria is becoming a rival of Ghana. Though also troubled by 'swollen shoot' disease, the production, promoted in part by co-operative societies, is now approaching one half that of Ghana. The kola-nut production has increased so much that imports are no longer needed. Bananas are a notable crop in the Southern Cameroons Region. Cotton has received very great attention; it has long been grown over large areas in the middle of the country for local use, and its cultivation by the natives farming for themselves has been encouraged. In the Yoruba country, where Ibadan is an important centre of production, the people grow a variety of about 1-inch staple. There has been a rapid increase here and in the Northern Provinces; cultivation of long-staple cotton as a cash crop centres at present in a region west of Zaria, its development in the Lake Chad and Sokoto districts being dependent on the establishment of better communications. In the Northern Region there has been a remarkable growth in the production of ground-nuts, which yield a very big export; further development largely depends upon railway extensions, as the effective economic distance for animal transport is about 100 miles from the railway. Benniseed (sesame), especially in the Makurdi district, is another cash crop of the savanna, while tobacco is increasingly cultivated in the Zaria and other areas, notably round Ogbomosho and Oyo in the Yoruba country. Livestock are necessarily found mainly in the savanna country, and the trade in hides and skins is of increasing importance, while there is a large internal trade in meat. A recent census showed $3\frac{3}{4}$ million cattle, $5\frac{1}{4}$ million goats, $2\frac{1}{2}$ million sheep, 560,000 donkeys, and 160,000 horses in the Northern Region; the conditions in the south—the wetter forest zone—are much less favourable. The Government is making strenuous attempts to control disease. The production of food crops is becoming inadequate for the rising population, a situation not improved by high prices for primary products. Experiments with mechanized methods of clearing bush and the

introduction of simple machinery for the farmers' use have not on the whole been successful, though experiments on these lines will doubtless continue. It is noteworthy that superphosphate is being increasingly used on impoverished light soils in the north. Guinea corn and millet are, of course, the typical grains of the savanna zone; rice, maize, cassava, and yams are the main crops of the south. Rice seems to be the crop most likely to benefit from mechanization in the near future.

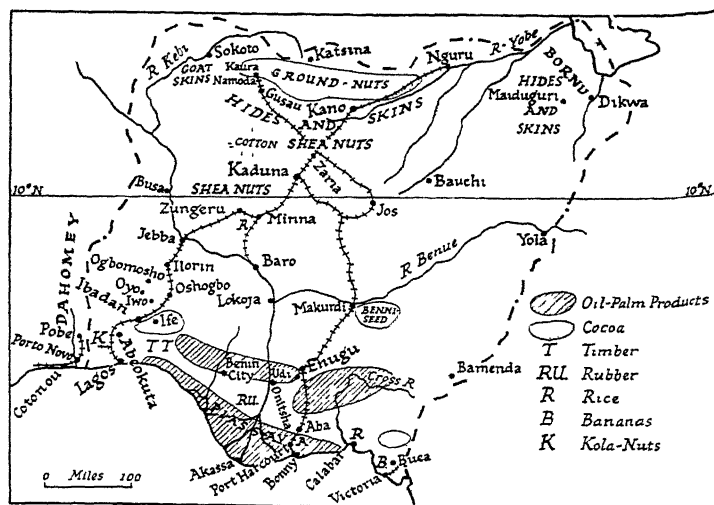


FIG. 94. NIGERIA—CHIEF AREAS FOR SOME IMPORTANT PRODUCTS

Only areas contributing substantially to export trade are shown

The main rivers are heavily fished, so much so that Government fish farms have been established for the maintenance of stocks. Sea-fisheries have also received Government encouragement.

Minerals The mineral wealth of Nigeria is mainly in coal, tin, and oil. The railway running north from Port Harcourt was built to tap the only important coalfield in West Africa—that of Udi for which Enugu is the principal centre. The coal is worked by adit; it is not of very good quality, being of late Cretaceous age and sub-bituminous in character. The annual production is about

600,000 tons, some half of this is used in Nigeria, shipping takes a good deal, and some is exported to other lands. The railway goes on to the tinstone (cassiterite) area in the western part of the infertile Jos plateau, the chief exploitation being in the Bukuru and Ropp granites, for which Jos is an important centre; the annual export is about 8,000 tons. Hydro-electric power is used in the tin mining (the Jos plateau has considerable resources in water-power), but the tinstone reserves are becoming exhausted

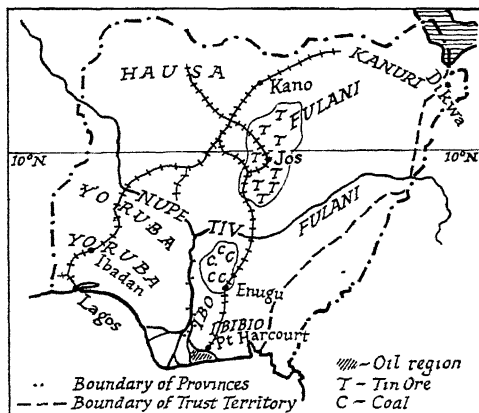


FIG 95 NIGERIA—REGIONS AND CHIEF MINERALS

The map also indicates the location of some of the more important African peoples. The town of Dikwa is sometimes referred to under the name Kuka

Associated with the tin is the rare mineral columbite, which yields niobium; this is the chief producing area in the world of this mineral, in demand in connexion with special steels. Uranium ore is also known to exist in this area. Mineral oil production is developing rapidly near Port Harcourt and pipe-lines convey oil to that port for export

Industrial Development. The lack of cheap power is a serious handicap. There is now a considerable number of palm-oil mills and rice mills in the south, as well as some ground-nut mills in the north. There are many sawmills, and Sapele has a plywood factory. Cigarette-making and grapefruit canning are carried on

Lagos (270,000 inhabitants) has the bulk of the trade and shipping. The entrance to the port has been constricted and a regularly dredged depth of 32 feet is available. Direct discharge at Apapa wharf on the mainland side of the lagoon is an important facility. As the federal capital and an international airport with the beginnings of industrial development, Lagos has grown rapidly and has been compelled to adopt some modern housing-schemes. Port Harcourt (72,000) ranks as the next port, and, despite a bar and little space for manœuvring, is expanding its trade. Both Lagos and Port Harcourt serve the forest and savanna zones; the latter is the chief port of the Eastern Region, linked by rail with the mining areas and by pipe-line with the oilfield. Calabar serves the Cross river country, and other ports are Forcados, Burutu, Warri, and Sapele

Inland is a number of large towns. Ibadan, the largest town of tropical Africa, has with its farming suburbs 460,000 inhabitants, situated in a region with cocoa as its cash crop. This sprawling urban area in the Yoruba country, remarkable for its many large towns, including Iwo, Ogbomoshò, Oyo, Oshogbo, Ife, and Abeokuta, is the chief city of the Western Region. Dominating the Northern Region is Kano (130,000), the great Hausa city, with 14 miles of walls, surrounded by an extensive farmed area in which 'satellite towns' are developing. Within a radius of some 70 miles of Kano is some of the best-farmed land in Nigeria. The land is continually farmed, fertility being maintained with the assistance of animal manure and town refuse. Kano has been an *entrepôt* for 800 years, a market for the Sudan 'grass road' and the adjacent Sahara border, and retains a large trade in salt. Domestic weaving of cotton cloth, mostly indigo-dyed, is an old occupation. A beginning has been made with factory weaving; a specific industrial area is planned. It is a great market for ground-nuts, and its old connexions with the Sahara have been supplemented by the railway to Lagos. The railway to Nguru has increased its importance. It is the largest city of the Northern Region and its international airport becomes increasingly busy. Round Sokoto irrigation development is proceeding, and the branch line from Zaria, an important junction, to Kaura Namoda serves cotton-growing. Dates, rice, Guinea corn, indigo, tobacco,

and beeswax are among the varied products of this Northern Region, which has a big trade in hides and skins. Donkey transport is of great importance.

Urbanization is proceeding apace in Nigeria, notably in the Yoruba country, but to a lesser extent elsewhere. Maiduguri in the somewhat remote Bornu region has 46,000 people and is a customs airport. Enugu is the capital of the Eastern Region, of which Onitsha (72,000) is the largest town, Aba is nearly as large; Port Harcourt and Calabar are other considerable centres.

Rapid educational progress is being made in Nigeria. The training of teachers is expanding and Ibadan has a college of university status as well as a branch of the Nigerian College of Arts, Science, and Technology.

The Cameroons Trust Territory. This former German territory is in two separate strips along the eastern border. A plebiscite in 1961 will decide its constitutional future. The total area is 34,000 square miles with nearly $1\frac{1}{2}$ million people. There is much highland, in parts of which pagan tribes carry on terrace cultivation, though, owing to soil erosion, they are tending to move down to the lowlands. The coast belt is marked by estuaries, creeks, and mangrove swamps, as well as by the great volcanic Cameroon Peak, over 13,000 feet in height. Much of the highland is grassland, and the Bamenda district, in particular, has many cattle. The Cameroons Development Corporation controls the important banana plantations of the coast region, where cocoa, coffee, and palm-products are available for export. A short railway runs inland from the port of Victoria past Buea; Batu and Tiko are other ports.

Trade. Sustained demand for Nigerian products in the post-War period has led to a considerable expansion of trade, imports being stimulated by the enhanced value of exports. Textiles—cotton and rayon, especially the former—form the largest import, and Japan and Western Germany are competitive with the United Kingdom in this trade. Progressive development and improved communications have led to considerable imports of iron and steel goods, machinery, cement, motor vehicles, petroleum products, and electrical apparatus, while there is a steady demand for such things as corrugated iron, jute products, tobacco and cigar-

ettes, and bicycles. Sugar, fish, and salt are among the food imports. While the United Kingdom sends about half the imports other industrial countries, notably Japan, have appreciable shares. Some 75 per cent. of the exports normally go to the United Kingdom, oil-palm products generally lead the export list, but cocoa is very important, and other significant items are ground-nuts, tin ore, rubber, hides and skins, cotton, timber, and bananas.

REPUBLICS WITHIN THE FRENCH COMMUNITY

Seven of France's former eight West African Territories in 1960 became independent republics within the Community. They

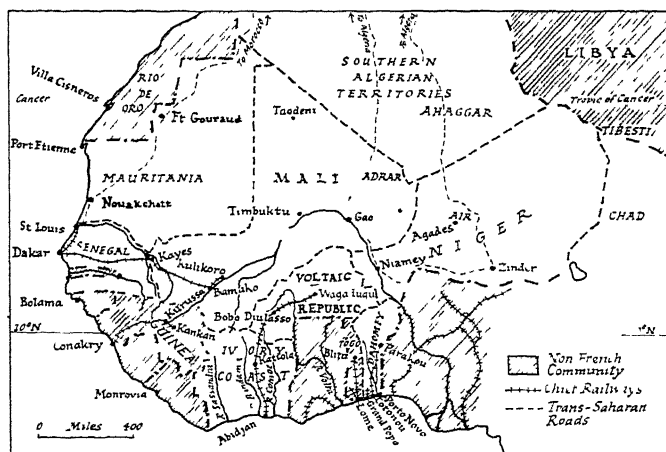


FIG 97. FRENCH COMMUNITY TERRITORIES

Early in 1961 Mali left the French Community

are the Senegal, Voltaic, Dahomey, Mali, Ivory Coast, Mauritania, and Niger republics. Nearly all Mauritania (see p 116) and the greater part of the Mali and Niger republics, belong to the Sahara region, so that fully half of the total area of more than 1,700,000 square miles is outside the West African region. The area within it, therefore about 800,000 square miles, and has a population of approximately 16,000,000 people with some 75,000 Europeans, three-quarters of whom are French. The

Territories comprise essentially a broad belt of savanna, merging on the north into the Sahara, and sending two tongues southward into the forest zone. The greatest density of population is found in parts of this forest zone, in the western part of the Senegal republic, and in favourable areas of the central savanna zone round towns such as Segou, Bobo Diulasso, and Wagadugu. A fair population clings to the valleys of the Senegal and Niger. Broadly speaking, the population density is low, and development plans are hindered by the limited labour supply. Senegal and the former French Sudan (calling itself the Sudanese Republic) formed in 1959 a federation called Mali, the name of a medieval Sudanese empire. This federation broke up in 1960 when the Sudanese Republic adopted the name Mali.

While the development has not reached so advanced a stage as in Ghana and Nigeria, changes similar to those noted in the latter are taking place. New products have been developed, special efforts being directed to cotton, now grown in many areas, the total export of which is not yet large, but has been built up from nothing. There are about 2400 miles of metre-gauge railway, supplemented by some 24,000 miles of motor-roads and 3000 of navigable waterways. Good communications are vital to such a large and diversified area, which the French aimed at unifying, and striking improvements have been made so that, for example, only diesel locomotives have been used on the railways since 1954, and there are diesel railcars on all lines.

Senegal

Senegal (81,000 square miles; population 2,300,000, mostly Mohammedan) surrounds the Gambia, and has similar light and sandy soil. It is mainly Sahel savanna, with a long dry season, but south of the Gambia is Sudan savanna, as the wet season is longer. The Senegal and Salum rivers are to the north, and the Kasamance, with a good estuary, is to the south. None of these is a very satisfactory waterway; the Senegal is obstructed by a sand-bar at its mouth, and all navigation is suspended from mid-April to mid-June. A little rubber is obtained from the Kasamance region and gum from the northern fringe. The usual savanna products are met with—ground-nuts, millet (mostly excessively

small varieties), beans, maize, inferior native cotton, cattle (chiefly of the zebu type), sheep, goats, horses, and donkeys. Some rice, palm-kernels, and cassava are produced in the south, and gum arabic is collected in the interior districts. Methods of tillage and rearing animals are primitive, and labour is scarce. Salt and fish are obtained in the coastal districts. Certain developments, however, modify this picture.

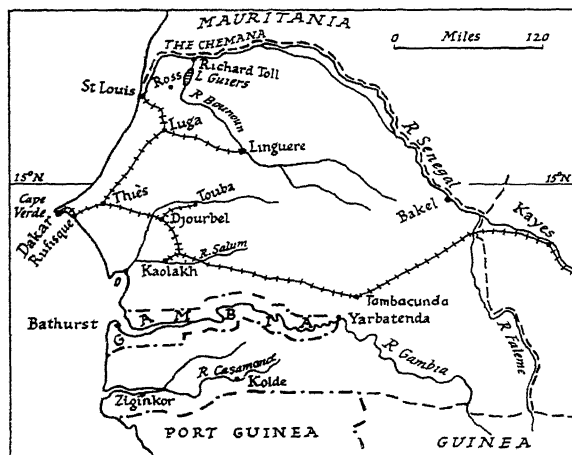


FIG. 98. SENEGAL

The flood plain of the Senegal begins at Bakel, and much attention is being given to its utilization. During the dry season (November to June) the natives use it for millet and maize, and to water their flocks and herds. Some pumping for dry-season crops has improved the land use to some extent, based on the work of the experimental station at Richard Toll, where a tributary joins the river. A dam on this stores flood water, enabling a considerable area to be irrigated; mechanized rice-growing is carried on, and the cultivation of wheat, cotton, and fodder crops is being developed.

Great emphasis has been placed upon the ground-nuts industry with a view to its rationalization and modernization. Land is carefully cleared and hedged with trees; steps have been taken to

limit soil erosion, and improved seed is distributed; a modern decorticating and oil-expressing plant deals with much of the crop. It is a great economy of space to export the shelled nuts or the ground-nut oil.

The capital of Senegal, the most prosperous of these republics, is Dakar, which now incorporates Goree, a small island on which the first French port was established in the seventeenth century. Dakar (240,000 inhabitants, including 30,000 Europeans), upon



FIG. 99. MECHANIZED RICE-HARVESTING, RICHARD TOLL, SENEGAL

Photo Information Senegal-Mauritanie

which converge important lines of communication by land, sea, and air, is situated at the southern end of the Cape Verde promontory. It has been called the "third port of France," ranking with Algiers for this distinction, and there is a large European section to the town. Its sheltered, deep-water harbour, artificially improved, has modern equipment, including refrigerated and oil storage; there are oil-seed crushing installations and a variety of factories. It exports mostly decorticated ground-nuts and ground-nut oil; phosphates found within the territory are also exported. Its railway to the Niger gives it a large, though underdeveloped, hinterland. It is a fortified naval base, has a submarine cable to Brest, is visited annually by a very large tonnage of shipping, and has one of the most important international airports in Africa.

Kaolack (40,000) and Ziguinchor are river ports of considerable value; the former, on the Salum river, is the chief port of shipment for ground-nuts, mostly undecorticated, brought chiefly by its railway connexions with the interior

The trade figures for Senegal have hitherto had those of Mauritania and the Mali Republic merged with them. They show that these three territories receive more than half the imports and send away more than a third of the exports of these French community lands. For the bulk of this trade Senegal is responsible.

The Mali Republic

That part of this territory falling in the West African region covers much of the Upper Senegal and Upper and Middle Niger basins. About half the total area of 460,000 square miles, but more than 90 per cent. of the total population of 3,700,000, are included in the region. This part is mainly a savanna zone, with a rainfall (summer) varying from nearly 40" in the south to 10" in the north. The upper part of the Niger, assisted by its tributary the Bani, causes a great summer inundation above Timbuktu, normally covering an area of about 20,000 square miles. Reference has already been made (see p. 29) to the former inland lake that existed here, and there is much delta land above the present flood level available for irrigation (which began with a few pumping schemes), as well as other adjacent land. Now there is the Sotuba dam just below Bamako and a much larger one at Sansanding, which raises the level of the river by more than 16 feet. The scheme is under the direction of L'office du Niger, an official department for the promotion of agricultural development. Many African farmers and their families, supplied with essential equipment for working their holdings, have been settled in the area at present irrigated, and some scores of villages have been established, co-operative organization is encouraged. The development is proceeding on lines similar to those of the Gezira scheme. Rice, an important local food, is the chief interest, but cotton and millet as well as fodder crops are used in the rotation. The land is prepared for cultivation by tractor, and the mechanized production of rice is being developed. Nevertheless, the expansion of

this scheme has been disappointingly slow, and the hopes of a large cotton production have still to be realized.

The general farming conditions and products are typical of the Sudan. Besides ground-nuts, which provide the chief export, attention is given to the shea-nut, also valuable for its oil; and in the Kayes region flood conditions are utilized in connexion with plantations of sisal and kapok. The inundated areas are important dry-season cattle pastures. On the northern fringe gum-acacias and the dum-palm are found, dates are cultivated, and

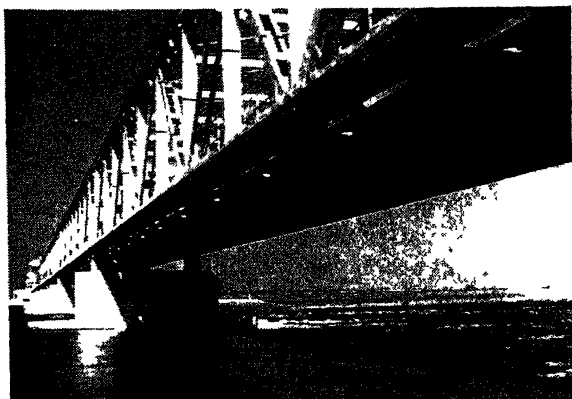


FIG 100 THE SANSANDING BARRAGE

A road bridge is above the barrage

Office du Niger

camels reared. Very large numbers of cattle and sheep are kept, and there is some export southward of live cattle, donkeys are very important for transport. A little alluvial gold is found in the Falémé valley.

The administrative centre is Bamako (70,000 inhabitants), the terminal point of a navigable section of the Upper Niger, and a town of importance even in the time of Mungo Park. It is of growing importance as an airport. Timbuktu (8000 inhabitants), on the edge of the inundations, is an oasis town that has lost a good deal of its importance with the decline of trans-Saharan

traffic and the slave-trade; it is a small market for grain and salt. Its river-port, 9 miles to the south, is Kabara. In 1828 the first European entered Timbuktu and got out to tell the tale. Up to that time it was reputed to be a city of fabulous wealth, it proved, however, to be "a heap of houses badly built of earth." Wars, the slave-trade, and bad hygiene are responsible for a relatively thin population over the greater part of the area. Communications are largely dependent on the Niger and the important railway Kulikoro-Bamako-Kayes-Dakar. The northerly winds assist

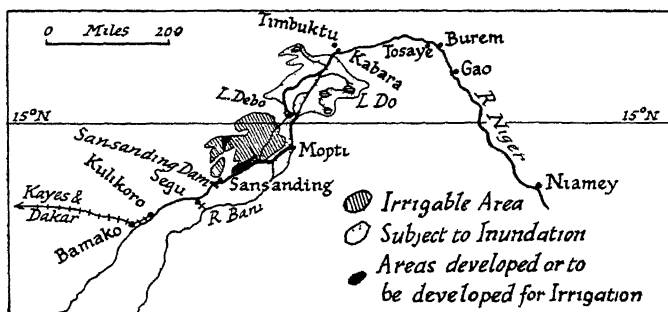


FIG. 101. THE NIGER BEND

The irrigation development is taking place in what is often called the 'Inland Niger Delta'

navigation on the Niger to feed this railway in the dry season, and the ground-nut crop can be exported as harvested instead of having to wait for the following summer flood. Gao is where a trans-Saharan motor route from Niamey leaves the Niger for the Mediterranean. The Mali Republic's contribution to overseas trade is small, distance from the sea being a serious handicap.

Niger

Only a relatively small part of Niger is within this economic region (see Fig 97). The Sudanese zone is inhabited chiefly by Hausa, who produce the usual savanna crops, and keep many cattle. Niamey, the administrative centre, on the Niger, and

Zinder are the only towns of importance, they are connected by road, and the latter still maintains a certain caravan trade.

Ivory Coast

Ivory Coast (124,000 square miles; population, 2,610,000) stretches inland between Liberia and Ghana. Its name has only

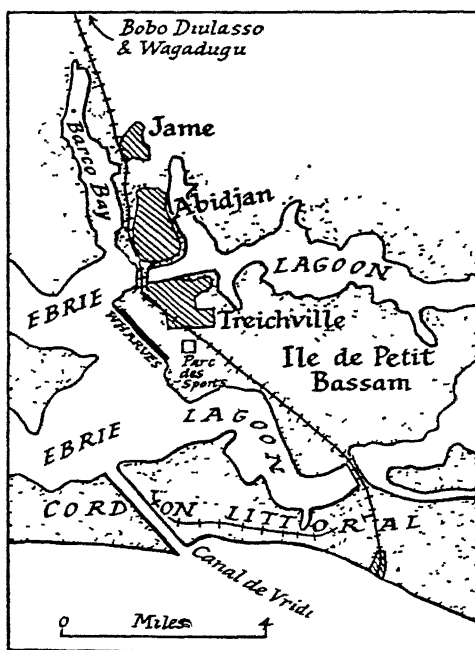


FIG. 102 ABIDJAN AND THE VRIDI CANAL

historic significance. There are numerous not very useful rivers flowing southward from the park-land highlands, the chief of which are the Cassandra, Bandama, and Comoe, the last flowing into a lagoon 124 miles long and 12 to 15 feet deep, connected by canal with the lagoon into which the Bandama flows. The

western section of the coast is rocky, and the Guinea Current here attains its maximum eastward flow of 3 knots. The forested coast belt has a heavy rainfall, and the main exports are coffee and cocoa (which is now about one-fifth of the Ghana production); mahogany and palm products are also of importance, especially the first. Though the labour problem is difficult, much attention has been given to coffee, kola-nuts, bananas, pineapples, copra, kapok, and cotton. The northern part is savanna country, chiefly important for cotton, of which some is exported, cattle, and shea-nuts, millet is a leading food crop. Alluvial diamonds are efficiently worked on a tributary of the Bandama River south of Korhogo. Half are gem stones.

Formerly external trade had to go by rail and along the pier of Port Bouet, from which goods were conveyed in boats to ships anchored beyond the pier because of the swell. All this inconvenience ended in 1951 when a ship canal was cut through the strip of low-lying land that enclosed the lagoon, thus giving direct access to Abidjan. Sassandra, with a pier, is the only other outlet of note. The railway goes northward from Abidjan (population 125,000), which is the administrative centre and has grown rapidly, to Bouake and Katiola, and continues into the Voltaic Republic to reach Bobo Diulasso and Wagadugu. Coffee, cocoa, diamonds, and timber are leading exports.

The Voltaic Republic (Upper Volta)

This territory of 106,000 square miles and 3,450,000 people is far inland and entirely in the savanna zone, its average population density is higher than that of any other of these new republics, except Dahomey, though probably no greater than that of the savanna areas of the Mali and Niger Republics. Wagadugu has a rainfall that both in amount and distribution resembles that of Kano, it is in the Sudan savanna zone, while the north of the territory belongs to the Sahel savanna. Animal husbandry and crop production provide the occupations; cattle are of some importance, and the cultivation of ground-nuts and cotton has been encouraged; cotton seems to be better established than in

some of the other territories. Deposits of manganese ore are known to exist north-east of Bobo Diulasso.

For oversea trade this territory is dependent upon Abidjan, the railway from that port runs northward to Bobo Diulasso (40,000) and continues eastward to Wagadugu (35,000), a town grown substantially in importance since it became recently the administrative centre. The chief roads radiate from it, and, like Bobo Diulasso, it has useful air communications. The oversea trade is small; exports include ground-nuts, shea-nuts, and hides and skins.

Dahomey

Dahomey (44,000 square miles, population, 1,710,000), has a relatively dense population of Negroes who are good agriculturists, as in the adjacent part of Nigeria. The sandy lagoon coast and the general conditions are similar to those of Western Nigeria. The chief river is the Weme, which flows into a big lagoon. Palm-kernels and palm-oil—the former much the more important—provide the greater part of the exports; this territory is the biggest producer of palm-kernels, but the prevalence of old trees has led to some decline in this respect. The typical forest and savanna products are found, and encouraging experiments have been made with coffee, cocoa, coconuts, vanilla, kapok, and cotton. The sea-island variety of cotton, acclimatized by hybridization with local varieties in agricultural stations, has been introduced into the central districts, and there is now some export. Dahomey was pacified and redeemed from widespread human sacrifice only at the end of the nineteenth century.

Porto Novo (30,000 inhabitants) is the administrative centre, and has a good deal of lagoon traffic—some even with Lagos. The chief trade is done by Cotonou, which has a very long jetty reaching beyond the bar. There is a coastal railway from Porto Novo to Whydah; besides a short line running inland from Porto Novo to Pobe, there is a long one into the interior from Cotonou passing through Save to reach Parakou, from which point a good motor road runs to the Niger. The chief exports are palm-kernels and palm-oil, coffee and cotton.

Trade. The total trade of these republics is considerable and is

mainly with France, which sends more than two-thirds of the imports and takes nearly two-thirds of the exports. Cotton piece goods have the highest place among imports, and there is a considerable total import of manufactured goods connected with transport, development, and the needs of the native peoples. Characteristic exports vary with the territory, and many details have been given earlier in this chapter. The dominance of Senegal has already been discussed, but the Ivory Coast has an increasing share of the total trade. Niger and the Voltaic Republic have very small shares.



FIG 103. COCONUT PLANTATION NEAR LOME, TOGO
Elder Dempster Line

THE TOGO REPUBLIC

This former French Trusteeship (21,900 square miles, population 1 million), became an independent republic in 1960. It has a relatively dense population. It received great attention from the Germans and was in 1913 their only self-supporting colony. The coast zone has the relatively low rainfall associated with the neighbouring part of Ghana, and the rainfall increases northward, declining again in the savanna zone of the north. Cocoa was

developed by the Germans and provides the leading export. The cotton production, though small, is slowly increasing, and there are four ginneries. Oil-palm products (mostly palm-kernels), coffee (largely grown by African farmers), copra, and cassava all have importance, and the northern zone sends ground-nuts (decorticated) and shea-nuts to the coast for export. A railway runs northward from Lome to Blita, in the south of the savanna zone, and a shorter one to Palime, which place collects some traffic from neighbouring Ghana. Lome (30,000 people) is the administrative centre and pier-port.

PORTUGUESE POSSESSIONS

Apart from certain islands in the angle of the Gulf of Guinea—considered later—there are two Portuguese territories.

Portuguese Guinea (14,000 square miles; estimated population, 560,000, including 2300 Europeans) is an area of coastal mangrove swamps, rain forest, and savanna woodland; it has a low, irregular coastline, off which is the Bissagos Archipelago. The capital and chief port is Bissau, exporting mainly ground-nuts, ground nut-cake and -oil, palm-kernels and -oil. There is much development of coastal lands for swamp rice cultivation and rice is the main food, although ground-nuts are more important in the interior. Transport is mostly by river.

The **Cape Verde Islands** (area, 1560 square miles, population, 185,000, two-thirds half-caste, but including 3000 Europeans) are fourteen in number; ten are inhabited. They lie about 300 miles off the coast. They are volcanic in origin, and the highest peak, Fogo, exceeding 9000 feet, has only recently become extinct. The prevailing north-east trades render the islands generally arid, but mountain-fed rivers provide fertile valleys. The islands take their name not from the vegetation, but from the green sargasso weed which drifts there from mid-Atlantic. The seat of government is Praia on Santiago, but the chief commercial centre is St Vincent (population, 20,000), an important fuelling-station and port of call for vessels engaged in the South American trade; it is also a cable-station for South America and West Africa. Coffee of high quality, hides, castor oil, sugar, tobacco, oranges, and maize are among a large variety of products.

GUINEA

This former French territory (107,600 square miles, population, 2,498,500) became independent in 1958. The European population has declined from 7000 to about 2500. French is the official language and the people are predominantly Moslem. A federation or union with Ghana is being built up.

This republic embraces the greater part of the Futa Jalon plateau. The general conditions are similar to those of Sierra Leone and Conakry has as much rain as Freetown. The large, more open upland region is an important cattle-rearing area and could be further developed for maize and tobacco cultivation. The heavy summer rainfall of the coastal districts causes the growth of a good deal of forest. In this zone palm-kernels and palm-oil (especially the former) have great importance, and rubber and timber are obtained. There are plantations of rice, bananas, pineapples, and coffee, the last being successfully cultivated near Victoria, on the Nunez river. The banana export is considerable. The interior has the upper reaches of the Niger, and is savanna country, providing ground-nuts, sesame, hides, and beeswax for export. Some alluvial gold is found by the Upper Niger north of Kankan.

Immense reserves of high-grade iron ore are worked in the Kaloum Peninsula adjacent to Conakry, as are large deposits of bauxite on the Los Islands. Further vast resources in bauxite occur in the Futa Jalon. Work on their development is going on and a large aluminium plant is planned. At present the bauxite is sent mainly to Canada.

Conakry (population 40,000), the capital, is situated on one of the Los Islands. It has grown rapidly, and a road and railway connect this modern and important town with the mainland. A hydro-electric power station, 180 miles away, provides power for domestic and small industrial purposes. The railway passes through Kindia and Mamou in the Futa Jalon, to Kurussa, on the Upper Niger, and has been continued to Kankan, on a tributary; motor-roads serve it, and a road continues from Kankan through broken and not easily accessible country into Liberia. Trade has been fostered with the U.S.S.R. and East Germany.

LIBERIA

This country covers 43,000 square miles, with an estimated population of 1,300,000. The state began with the settlement of a few freed American Negroes in 1822. It is estimated that only about 70,000 Negroes, including American Liberians, participate in the political life of the country and can be regarded as civilized in the sense of their being notably influenced by Western civilization. Nevertheless, considerable strides have been made in bringing the interior under the control of the Government. The European population is negligible, but English is the official language. Rising through hill country to upland of the savanna type in the north, Liberia has a rainfall similar to that of Sierra Leone. It is still mainly covered with forest. This is potentially a rich tropical area, but most of the produce exported from Monrovia and other ports comes from within a relatively short distance of the coast. For a long time the country stagnated and had a bad reputation for forced labour and even slave-raiding, and the former League of Nations insisted upon reforms.

The characteristic West African products are found here, but it should be noted that Liberian coffee is indigenous and for long provided the leading export. Piassava and the oil-palm are abundant, the latter yielding chiefly palm-kernels. There is a little cultivation of rice, cocoa, and sugar-cane, while a beginning has been made with banana cultivation and timber-cutting. A little alluvial gold is won, and both river and sea fisheries have local importance. The United States has a considerable interest in Liberia, and economic change began when an American firm established rubber plantations, which began to yield rubber about 1930, though the enterprise was hindered by an acute labour problem. To-day there are over 100,000 acres of rubber plantations. More change came during the Second World War when American forces came to the country. Since then a deep-water harbour has been completed at Monrovia, which exports high-grade iron ore brought by a short railway from the north. With American technical aid a beginning has been made with agricultural and health services, and development is proceeding.

Monrovia (20,000 inhabitants) is the capital and chief port.

It is at the mouth of the St Paul river, which has a long sand-spit, and exports rubber, iron ore, coffee, piassava, and palm-products. Fifty miles away is a modern airfield served by several air lines. There has been some road development, of which Monrovia is the chief centre. Grand Bassa, at the St John river mouth, is the chief port for piassava, and Cape Palmas is a smaller port. The lower courses of the chief rivers are useful for 20 or 30 miles, and a little trade is carried on *via* the Sierra Leone railway. Portage prevails in the interior.

Rubber provides some 60 per cent of the exports; iron ore comes next, and vegetable products make up most of the remainder. Much of the rubber goes to the U.S.A., and the United Kingdom is a considerable customer for exports and supplier of imports, which include rice, cotton goods, gin, clothing, and fish.

THE ISLANDS IN THE GULF OF GUINEA

These volcanic islands lie on the same south-west to north-east line of fracture as the volcanoes of the Cameroons. The maximum elevation, in Fernando Po, exceeds 9000 feet. The soil is fertile, and, lying as they do only a few degrees away from the equator, the islands have a hot and wet climate. On Fernando Po the rain falls mainly from July to October.

The Spanish islands comprise Fernando Po (780 square miles; population, 41,000, including 4000 Europeans), Annobon (7 square miles; 1500 people), and other smaller ones. Fernando Po, with the capital, Santa Isabel (10,000 inhabitants), on the north coast, is one of the most fertile areas in West Africa. Plantation agriculture—mostly for cocoa—is carried on, with a good deal of migrant labour from Nigeria; coffee and food crops are also produced, and on the cleared upland cattle are raised. The chief export is cocoa, which supplies the requirements of Spain.

The Portuguese islands of São Thomé and Príncipe (384 square miles, population, 60,000) are more important. São Thomé is by far the larger, and has most of the population, which includes over 1100 whites. Until 1912 this was the largest individual exporting area for cocoa in the world, it was then displaced by Ghana. The cocoa plantations, covering 125,000 acres, are

chiefly in the north-east, and, using labour imported largely from Angola, are usually equipped with light railways for transport. In these respects the industry is differently organized from that of Ghana. Excellent coffee is grown, and there are plantations of coconuts, oil-palm, and cinchona. A 9-mile railway goes inland from the port of São Thomé. Príncipe, cleared of the tsetse fly, has chiefly cocoa plantations.

CHAPTER VII

CENTRAL AFRICA

GENERAL CONSIDERATIONS

THIS major region, stretching roughly from 17° N to 17° S., bordered on the west by the Nigerian area and the Atlantic and on the east by Sudan and the Lake Plateau of East Africa, includes considerable diversities of relief and drainage as well as of climate. But its economic connexions are mainly with the Atlantic, it is for the most part an area of relative under-development, so that although its vegetable products are very similar to those of West Africa it is in this respect behind that region in importance. This is in large measure a reflection of the much lower density of population. Its dominant central feature is the Congo basin, but it includes a large part of the Chad basin, the upper drainage of the Zambezi, and a number of independent rivers flowing to the Atlantic, the most southerly of which, the Kunene, is the last permanent river before the Orange is reached.

Physical Features Round the middle course of the river Congo is a relatively low portion of the African plateau, which was formerly submerged. The lowest parts are now indicated by Lake Tumba, Lake Leopold II, and Stanley Pool. Into this shallow basin area converge a large number of streams from north, east, and south; the Ubangi-Welle system drains the northern part, the Kasai and its many tributaries drain the southern area, and many smaller streams the east. In the east the basin rises to the highlands that border the Western Rift Valley, which largely exceed 6000 feet, while the volcanic area of Mount Mfumbiro, which blocks the valley between Lake Edward and Lake Kivu, reaches 14,600 feet. This middle Congo basin is cut off from the Atlantic by the high rim of the African plateau, which varies in elevation, reaching more than 3000 feet in Gabon and over 4000 feet in Northern Angola. The highlands bordering the basin are chiefly composed of ancient crystalline rock; in the

north they consist of rolling upland, of no great elevation except in the Adamawa Highlands of the Cameroons and the Dar Fertit region, which well exceed 3000 feet. In the south the Bihé plateau and the Katanga Highlands reach over 5000 feet. The basin itself is filled with Secondary sandstone, but below the Stanley Falls a

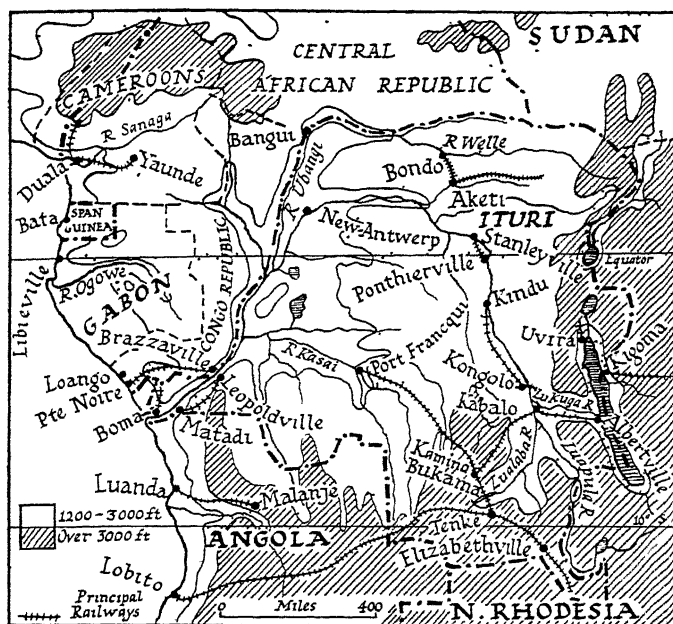


FIG 104. THE CONGO BASIN

Note the constriction of the Congo basin in the lower course of the river

vast area is covered with alluvium, recent by the main river but for the most part deposited in the bed of the former lake or inland sea.

The Congo takes its rise as the Chambezi to the south of Lake Tanganyika, and, passing through Lake Bangweulu, in the swamps of which Livingstone died, reaches this economic region as the Luapula. It is seriously obstructed before reaching Lake Mweru; then, after leaving this lake as the Luvua, it is joined by the

Lualaba from the Katanga plateau, having collected many head-streams it flows northward as the Congo. The Lukuga, occupying a deep trench, is received from Lake Tanganyika, after which, much interrupted by rapids, the Congo flows northward, to cross the equator at the Stanley Falls. Here it enters its middle basin, and now provides nearly a thousand miles of navigation, despite its frequent division into numerous channels. It is commonly a very wide river, with many islands, in this part of its course, which finishes at Stanley Pool. Below this point it descends by the Livingstone Falls from Leopoldville (950 feet) to Matadi (85 feet) in a course of 220 miles, cutting a gorge through the Crystal Mountains. Below Matadi the Congo estuary is 5 miles broad for about 100 miles to the Atlantic, but shifting sand-banks and a very strong current, especially in the rainy season, make its navigation difficult. It is one of the few rivers of Africa with no delta, but the powerful current in the estuary carries a great volume of muddy water far into the Atlantic. The Livingstone Falls were an important reason for the late discovery of the Congo drainage system, which awaited Stanley's famous expedition from the east in 1876. The lower river was known at a much earlier time. It is obvious that the Middle Congo and its tributaries provide a remarkable network of navigable waterways, but the river is handicapped as a unifying influence upon the population of the basin because of the interruptions in navigation and the poor access to the sea. Nevertheless, the political divisions illustrate the importance that was at first attached to it as a possible waterway; it was internationalized towards the end of the nineteenth century, and the middle river for part of its course became the common frontier to French and Belgian territory. Portugal's footing on the left bank of the estuary recalls that country's early trading days with Africa.

In the Bihé plateau rise rivers running southward to the Ngami basin and the Zambezi. In the north of this economic region the Shari and the Logone, draining to Lake Chad, are having their head-waters captured by the Benue and Ubangi, and flow through an area of soft Tertiary deposits, swampy in summer, into a lake that is obviously shrinking, the rivers, however, are very useful in an area in which little other convenient transport is available.

In the east is included some of the drainage of the Western Rift Valley; Lakes Kivu and Tanganyika belong to the Congo basin, while Lakes Edward and Albert drain to the Nile. Lakes Kivu and Edward are wholly within this economic region, and the Belgian Trust Territory takes in a notable portion of the Lake Plateau.

The Atlantic coast is marked by a large number of short rivers eating into the rim of the plateau, of value for navigation only in their lower courses. The more noteworthy are the Sanaga, Ogowe, Kwanza, and Kunene. The occurrence of a fair number of river estuaries makes this coast more hospitable to shipping than most stretches of West African coast.

Climate and Vegetation. Stretching through some 30° of latitude, and cut by the equator, this region naturally shows considerable climatic differences. Temperatures are uniformly high, but the greatest summer heat is experienced

in the north on the Saharan border. Along the equator the annual range is very small, mean annual temperatures varying little from 80° F.; the daily range, too, is very small, and in the wet equatorial regions of the Congo basin maximum readings seldom go above 90° F., and minimum readings do not go below 60° F., even in the dry season. The highlands of the east and south, towards the borders of this region, experience considerable modifications of

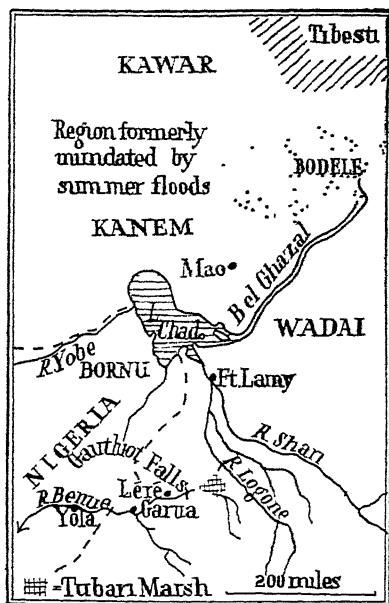


FIG. 105. CAPTURE OF LAKE CHAD DRAINAGE BY THE BENUE

It is probable that capture has already taken place at Garua, it is in progress at the Tubari Marsh

temperature due to altitude. They afford the chief opportunities for white settlement in Central Africa; the Kivu and Tanganyika Highlands, the Katanga area, and the Bihé plateau are noteworthy in this connexion. The west coast is naturally influenced by the Benguela Current, which reduces temperatures even at the Congo mouth, only 6° S. latitude.

The 'rainfall equator'—*i e*, the belt with heavy rain all the year round—is relatively narrow, and lies 2° or 3° north of the equator. New Antwerp has 67", the mean monthly rainfall varying from 2 6" to 9 3". Libreville, on the coast and on the equator, has 97", but only an insignificant amount falls in June, July, and August. It should be noted that on the whole the Congo basin receives less rainfall than the Amazon basin, owing to its being less open to oceanic influences. North and south of the rainfall equator the total amount of rain diminishes, and the dry winter season becomes more pronounced, while on the coast the warm Guinea Current north of Cape Lopez tends to increase the rainfall. South of that point the Benguela Current tends to restrict it, so that Banana has only 37" (practically none from June to September), and farther south the aridity rapidly increases along the coastal strip. Most of the rainfall is of the thunderstorm type—heavy or even torrential. In the Congo basin there is a rainstorm almost every afternoon and evening during the wet season, which in many parts lasts nine months, and the humidity is great even in the dry season, when mornings and evenings often bring dense mists. This is the principal reason why white people find the climate very trying.

A very large part of the area is covered with dense forest of the equatorial type. The Middle Congo basin is clothed with jungle, which climbs the rim to an elevation of about 3000 feet. In this forest the oil-palm, gum copals, plantains, rubber vines, and lianas are the characteristic growths. The number of species of plants is large, and the individual trees of the same type are scattered. Thus commercial exploitation of any particular species is difficult. Above this elevation the forest thins out into uplands of the park-land type, with a good deal of bamboo-forest, with increasing latitude and altitude open grass-lands become common. Such is the country in the interior of the Cameroons, in the

Tanganyika Highlands, and in the Bihé and Katanga plateaus. In its lower course the Congo flows through savanna forest, which arises from the relatively small rainfall. The southern half of the coastal strip of Angola is a semi-desert area comparable with that in the extreme north of the region lying to the east of Lake Chad.

Development. Apart from the mixed Hamitic Negro types along the Congo-Nile watershed the population consists mainly of tribes of Bantu Negroes, the more active and vigorous of which are commonly associated with the more elevated regions. Islands of pygmies, probably representing aboriginal races, remain in the Congo region, the Cameroons, and Gabon. The true pygmies, now mostly found in the Congo basin towards Lake Kivu, lead a poor, nomadic existence, and are famous for their skill with bow and poisoned arrow, but there are many 'pygmoid' groups that show inter-breeding with Negroes and are commonly settled in villages to-day. Portuguese have intermarried with Africans in the coast region, especially of Angola. The whole region—more especially the Congo basin and Angola—suffered tragically from the operations of the slave-trade, the Arabs working from the east coast by the Congo highway and the Portuguese from the west coast. This trade, of course, has long been suppressed.

Broadly speaking, the plant and animal life is very similar to that of West Africa, as are the African methods of land use and the possibilities of tropical cultivation and farming on the highlands. Difficult communications have hindered the development of the region—distances from the interior to the coast are great, and the high rim of the plateau and the Livingstone Falls on the Congo are serious obstacles—while the fever-ridden forest belt, infested by the mosquito and tsetse fly, necessitates active sanitary measures if white traders and administrators are to thrive. The last forty years have been marked by great efforts by the Belgians to promote development in the area, and lessons provided in West Africa and other tropical areas have been studied with profit, and great progress has been made. The time when the Congo provided a large proportion of the world's rubber by mere collection from wild plants is past, although there is now a little plantation development. The oil-palm provides the staple vegetable exports to-day, and among other crops coffee and cotton

have importance. Mineral exploitation has advanced actively, the known mineral resources are considerable, as the highlands in the neighbourhood of the Congo-Rhodesian border consist of richly metalliferous Archæan rock. The French too have promoted tropical development, though again the physical obstacles in the areas they control are very great. Railways have been largely developed to avoid the unnavigable sections of the Congo,



FIG. 106. CONGO VILLAGE

The huts should be compared with those illustrated on pp 427 and 436.

Union Castle Line

but the line between Lobito Bay and the Upper Congo is a useful outlet for Katanga, while the railway from Cape Town which reaches this district continues through the Congo basin to the middle Kasai. Viewed broadly, the region is potentially of enormous richness, and much has already been done to promote its economic development. Nevertheless, the white man's part will be mainly limited to administration, trade, and the supervision of agricultural and mineral development. White settlement is at present principally found in the higher parts of Angola, the highlands bordering the Rift Valley in the neighbourhood of Lake Kivu, and the Katanga plateau. At the same time, there are notable 'pockets' of Europeans in the administrative centres and larger towns of the whole region

France, Belgium, Portugal, and Spain have shared the government of this region, though the first two no longer exercise control. Administration showed interesting contrasts within this great area, though in some ways Belgian and French administrations were similar. The latter pursued the policy of direct rule and in large measure this was true of Belgium. Belgium, however, administered the Congo paternally, giving no political rights to either African or European. The Belgian Congo had no legislature. There was no formal colour bar, and white and black often worked side by side. Nevertheless when the Belgian Congo was given independence in 1960 only a handful of Africans had reached an educational standard permitting them to enjoy the same privileges as Europeans, and the new universities at Leopoldville and Elizabethville had very few African students. In Angola there is direct rule, but the African is generally underprivileged, and practices verging on forced labour for private purposes continue there. The region includes the Cameroon Republic, a small Spanish territory, and Ruanda-Urundi (at the time of writing still Belgian-administered).

REPUBLICS WITHIN THE FRENCH COMMUNITY

Four territories, Gabon, Middle Congo, Ubangi-Shari, and Chad (only the southern part of which is within the economic region), comprised former French Equatorial Africa. These are now independent republics within the French Community. They are known respectively as the Gabon, Congo, Central African, and Chad Republics. Without forming a political federation, they are now in a customs union and are co-ordinating their economic policies.

The following table shows the most recent population enumeration (1956) for these republics:

TERRITORY	ADMINISTRATIVE CENTRE	AREA (SQ MILES)	AFRICAN POPULATION	EUROPEAN POPULATION
Gabon	Libreville	106,000	394,000	984
Congo	Pointe Noire	166,070	753,000	10,429
Cent Afr Rep	Bangui	238,770	1,127,000	5,939
Chad	Fort Lamy	491,000	2,550,000	4,884
		1,001,840	4,824,000	25,236

It should be remembered that some two-thirds of Chad belongs to the Sahara zone (see p 118), leaving only about 160,000 square miles in the Central Africa region, only a small deduction, however, needs to be made in the population figure. There are, therefore, about 700,000 square miles of French Community lands in the region, with well over 4 million people, half of whom are in Chad, which is the least accessible territory. The low density of population limits plantation development, as little labour is available for it.



FIG 107. MECHANIZED EXTRACTION OF OKOUMÉ, GABON
Photo Information Afrique Equatoriale Française

Physically, these four republics are largely crystalline plateau country. They stretch from the Atlantic coast to the Congo and Ubangi, which part is comprised within the forest zone, then northward and eastward to include a large area of savanna country, where the Shari drains to Lake Chad. The only relatively easy access to the outside world is, apart from the coastal margins, by the Ubangi-Congo waterway, linked with the sea by the Congo-Ocean railway from Brazzaville to Pointe Noire. The problem of administering and developing this awkwardly situated area is clearly difficult, and progress has been slow, but it is of interest

that efforts to promote the production of cotton—a crop to which the French have given great attention—seem to have been more successful in Equatorial than in West Africa.

Gabon. This relatively small territory is mainly plateau land, with, however, a considerable area of coastal plain, through which the Ogowe flows to reach the sea a short distance south of Cape Lopez. It is entirely in the forest zone, with typical native food crops (cassava, yams, plantains, maize) and staple exports of timber and oil-palm products. The chief timber exported is okoumé (a type of African mahogany), and while the main export is in the form of logs, increasing quantities are sent away squared or cut. There is a small production of cocoa by Africans in the north-west of the territory, and Europeans have some plantations farther south. Alluvial gold is won in the valley of the N'Gounié, a southern tributary of the Ogowe, and manganese is known to exist. Port Gentil, sheltered by Cape Lopez, shares the trade with Libreville, and is distinctly more important in this respect. Some oil is produced near the former.

Congo. This is also in the forest zone, providing timber, palm-kernels, a little rubber, and small quantities of other forest products for export, while there are some coffee plantations. Along its eastern margin is the Ubangi-Congo waterway, which carries not only local products but also those from the territories farther north. These leave the waterway for Pointe Noire at Brazzaville, a busy town with over 5000 Europeans, it has an important airport, while a hydro-electric power station a few miles away serves domestic and small industrial needs. The artificial harbour of Pointe Noire, served by the railway, dominates in the trade not only of Congo but of all these republics.

The Central African Republic. This has a forested southern margin, in which Bangui is situated, with Guinea savanna and Sudan savanna farther north, where it includes the upper basin of the Shari. There the occupations of the Africans are mainly concerned with crops and cattle, and the French have successfully encouraged the cultivation of cotton and have established in the east of the territory some sisal plantations. These products, with others, including ground-nuts, are mostly collected at Bangui, on

the Ubangi, for transport to Pointe Noire, though some may go by road to Duala, in the Cameroons. Bangui is of growing importance as an air junction, especially for French and Belgian air lines; it has 2500 Europeans and 100,000 Africans.

Chad. The savanna zone of Chad, relatively wealthy in cattle, sheep, and goats, is better populated than are the other territories, but the long and costly export route to the coast seriously handicaps the development of cash products, the chief ones exported being cotton and ground-nuts. A feature of the territory is the

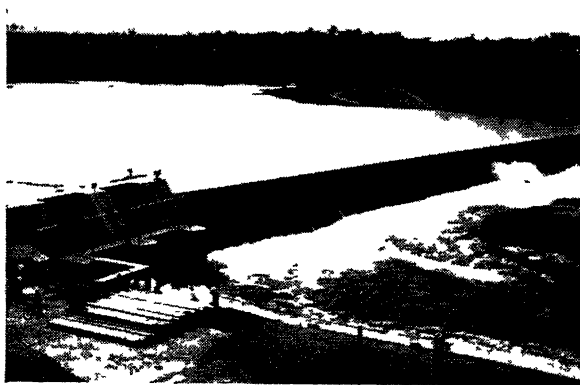


FIG. 108. THE DJOUÉ DAM, CONGO

Photo Information Afrique Equatoriale Française

shrinkage of Lake Chad, the reduction of the flood water brought by the Logone to the Shari, and therefore a smaller supply for certain forms of cultivation, and the degradation of the vegetation in the area by the lake.¹ Hydrological changes have already been noted (see Fig. 105), it would appear that African land use, especially the annual firing and the overgrazing of the land, has led to what is often described as the 'advance of the desert' in this area. Much attention is being given to the spreading of better practices among the African farmers, as soil erosion has become so menacing in this area, fortunately, well-water is plentiful.

¹ A French monograph, by H. Jacques Felix, bears the significant title, *La Vie et le Mort du Lac Chad*.

Chad is administered from Fort Lamy, on the Shari, its airport is of increasing importance.

Trade. Despite their vast area, the relative under-development of these equatorial lands leads to a trade that is not large. Of the imports, cotton piece goods, while important, do not have the dominating position they so often hold in tropical African territories, suggesting that the demands of the interior region are met in ways other than by direct overseas imports. Machinery, iron and steel goods, motor vehicles, and petroleum make up most of the rest of the imports, which include small quantities of sugar and wine. The most significant exports are cotton (from Chad and the Central African Republic) and timber from Gabon. Coffee and cocoa, as well as diamonds (from the Central African Republic) and gold, add something to the export values; exports of oil-palm products are small. France sends two-thirds of the imports and takes four-fifths of the exports.

THE CAMEROON REPUBLIC

This former French Trusteeship (166,500 square miles, over 3 million people, including 17,000 Europeans), became an independent republic in 1960. The coastal lowland, crossed by the principal river, the Sanaga, is relatively small; otherwise, the territory is plateau country, including the high Adamawa plateau stretching along the Nigerian border and sending a tongue eastward. The highest parts of the Adamawa are largely volcanic and exceed 9000 feet. There is some relative lowland in the extreme north towards Lake Chad, where the Logone river helps to form the boundary. The rainfall of the coast zone and of the seaward-facing highlands is very heavy, leading to densely forested country which stretches eastward towards the Congo basin, the northern half of the country is savanna, modified, however, on the high plateau, where more temperate conditions prevail.

The development of the territory from the coast inward clearly presents great physical difficulties. Nevertheless, the French actively continued the development which the Germans began during the period of their occupation. The density of population is much greater than that of the republics just considered, and

economically Cameroon is relatively much the more important. The Germans introduced cocoa, coffee, and bananas; the production of these, especially the first (reaching nearly one-fifth that of the Ghana production), is well established. Palm-kernels, a little palm-oil, much timber, and some plantation rubber are



FIG. 109. THE CAMEROONS AREA

For the Trust Territory see pp 220 and 229

also exported from the coast belt, while the interior sends small quantities of ground-nuts and some cotton. The French gave much attention to animal husbandry in the savanna zone and on the Adamawa highlands, and the numbers of cattle and sheep are increasing. Potato cultivation has been established in this highland in the neighbourhood of Ngaundere.

As elsewhere in tropical Africa, the effects of shifting cultivation are in evidence. The Guinea savanna zone, south of the Adamawa highlands, is said to be excessively degenerated through the opening up of the soil to erosion; the villages are tending to move south and thus to push back the boundary of the true forest zone.

The chief port is Duala, established by the Germans some way up the Cameroons river; its shipping facilities have been much improved, it is the terminus of the chief railway, and its airport is of considerable importance. The port particularly serves the cocoa export from the Sanaga valley and the Nyong valley, farther south. The railway crosses the Sanaga at Edea, near which is a hydro-electric power station and a plant which converts imported alumina into aluminium. The power station also supplies current to Duala and to the capital, Yaunde (6000 people), farther along the railway, which is being extended to Nanga Eboke. Yaunde has grown considerably and is an important road-centre, having good connexions with Bangui and Fort Lamy. Opposite to Duala is the banana port of Bonaberi, connected by rail with the highland settlement of Nkongsamba in a district notable for its coffee plantations. The continuation of this railway to Garua, on the upper Benue, and to Fort Lamy has long been projected.

The general character of the trade is similar to that of the new republics and is mainly with France. The large export from Cameroon of cocoa and in a lesser degree of coffee and bananas provides the chief contrast.

SPANISH GUINEA

This lies about the Río Muni, by which name this territory is often known, and includes several small islands, the largest of which, Corisco, has an area of $5\frac{1}{2}$ square miles. The total area is about 9500 square miles, and the total population about 215,000, including a few hundred whites. The Spanish footing here survives from earlier slaving times. The mainland has rain, and there is some trade in oil-palm products and timber, with a little cocoa, coffee, and sugar. The islanders' chief occupation is fishing. The only places of note are Benito, on the estuary of the

Benito river, and Bata. The area is administered from Santa Isabel, in Fernando Po (see p. 244).

THE REPUBLIC OF THE CONGO

This was Belgium's sole oversea possession and became independent in 1960, when administration broke down, economic activity declined, factional strife developed, and a majority of the Europeans left the country. This section necessarily relates to the period preceding the setting-up of the republic which covers 900,000 square miles, with a population of some $13\frac{1}{4}$ millions, included 82,000 Europeans, three-quarters of whom were Belgians. It is administratively divided into six provinces—Leopoldville, Equator, Eastern, Kivu, Katanga, and Kasai. A quarter of the Europeans are in the Katanga province, where mining activity is most prominent, there are nearly as many in the Leopoldville province, upon which converge the chief communications of the territory and which contains the capital. Equator and Kasai have fewest Europeans. The extent of the development that has been achieved is to some extent indicated by the fact that $2\frac{1}{4}$ million Africans are described as '*hors du milieu coutumier*'; these include over a million labourers and many engaged in mining, industry, commerce, and transport.

In addition to the six provinces, Belgium administered the Trust Territory of Ruanda-Urundi as an integral part of the colony. This added relatively little to the area, but well over 4 million to the population. With the province of Kivu, Ruanda-Urundi covers a large part of the Western Rift valley.

It is estimated that two-thirds of the whole area is open or relatively open country, and a considerable proportion of this in the east and south-east is probably suited to white settlement. After an unpleasant history in connexion with the rubber trade, the Congo Free State, founded by King Leopold II of Belgium after Stanley's great journey, was annexed to Belgium in 1908, and the development since then has been remarkable. The trade has greatly increased, largely because of the exploitation of mineral wealth, itself dependent upon the provision of railways. At the same time, Belgium has greatly increased the African production

of crops of both subsistence and commercial value, and has in addition established important plantations.

The opportunities for and obstacles to tropical development studied in West Africa are repeated here. The development has involved the overcoming of difficulties which include disease (especially malaria and sleeping sickness), natural transport obstacles, and shortage of labour, and has maintained constant activity in connexion with sanitation, agricultural research, the education of the African in improved methods, and the careful provision of means for him to maintain his food-supply while raising his cash crops. Some indication of what has been done is given by the great increase in the export of oil-palm products, the development of cocoa, coffee, and, more especially, cotton, the improvement and increase in the number of cattle and sheep reared, the control of animal diseases, the provision of important railway links, and the concentration of communications upon the highly mineralized Katanga district. It may be noted that in the extreme north-east of the country elephants are trained for transport work,



FIG 110. YOUNG OIL-PALM

The collecting of the large fruiting heads from mature palms involves an enormous amount of climbing

Information Bureau of the Ghana Government

and successful experiments in training buffalo have been carried out.

Vegetable Products and Livestock The natives depend, as may be expected, upon their small cultivation of rice, yams, plantains, cassava, and, in some districts, pulses, sugar, maize, millet, and

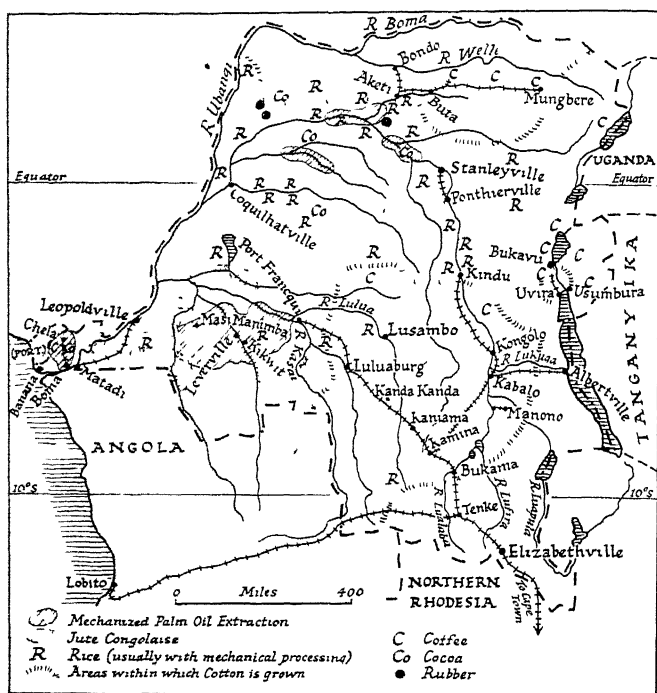


FIG 111. THE CONGO—VEGETABLE PRODUCTS

ground-nuts. The rivers are an important source of food, being rich in fish, the crocodile and hippopotamus are also caught. The elephant, though hunted, is still fairly numerous in the Congo basin, where the sandstone formation gives rise in many parts to a relatively thin type of forest. The oil-palm has great value for food and other purposes, and tobacco and native cotton have

long been grown. On this simple basis of Negro village-farming the Belgians have built an interest in cash products, notably cotton, rice, and the oil-palm.

Forest products as such play only a relatively small part to-day in the economy of the Congo. While a good deal of timber is cut for internal use, there is only a small export. There are saw-mills in the Mayumbe district, north of the river mouth, at Aketi, Kanda Kanda, and other places, and it has become necessary to establish forest reserves. Gum copal is still collected from



FIG. 112 PICKING COTTON—WELLE DISTRICT

The African farmers are usually organized in producer-co-operatives

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the swamps, but there is now no significant collection of wild rubber. Two related plants, *urena lobata* and *urena punga*, grow wild and yield a fibre known as *jute congolaise* which, now cultivated exclusively by Africans, sometimes provides an important export item.

A study of the map (Fig. 111) shows that cultivation generally is concentrated in the west and north of the basin and by Lake Kivu, and these areas are concerned largely with the oil-palm, coffee, cocoa, rice, and rubber, together with cotton, which is

also important in the south. The central and south-eastern areas have less cultivation, but there are important individual centres, such as Luluaburg, Lusambo, Kasongo, Kamina, and Kaniama (with a research station), and these have always cotton, often coffee, and sometimes oil-palm or rice. Very great attention has been paid to the oil-palm, now cultivated in plantations and by the Africans round their villages. By far the leading producing area is in the Leopoldville province round Kikwit and Masi Manimba, here, as in other producing areas, the extraction of palm-oil is mechanized, and the quality high. The tonnage of palm-oil exported is greater than that of palm-kernels (in contrast with West Africa), though it should be remembered that palm-kernels are also crushed locally for their oil, which provides an additional export. Palm-oil comes mainly from plantations, palm-kernels largely from African production. The oil-palm is neglected south of a line from Port Francqui to Uvira.

The Africans have been encouraged, with considerable success, to grow cotton and rice as cash crops. Rice cultivation is now widespread, the administration assisting with mechanized processing, it is found chiefly by the rivers in the north of the country. In good years there is a substantial export surplus. Even greater success has been achieved with cotton, more than three-quarters of a million African planters participate in its production, a variety of American 'middlings,' known as Triumph Big Boll, is now being widely grown, though this is giving place to Stoneville, which gives a bigger yield and has a slightly longer staple. Cotton is specially important in the Eastern province, Kasai ranking second but far behind. There are numerous ginneries, and the total export of ginned cotton has recently been nearly 50,000 tons annually.

While there is some African production of coffee, much is grown in European plantations—*arabica*, a large-grained coffee grown in the Congo region above about 2500 feet, and *robusta*, a small-grained variety suited to lowland conditions. *Robusta* comes specially from the Eastern province, where a railway line from Aketi to Mungbere serves the plantations. *Arabica* comes largely from the Kivu province, and is also cultivated in Ruanda-Urundi. Cocoa is a much smaller crop, and is grown in Mayumbe

European fruit-trees, tobacco, and wheat are also grown to a small extent

Minerals. In the heart of Central Africa is a mineral area (extending across the Congo border into Northern Rhodesia) that has attained great importance. It has a big production of copper,

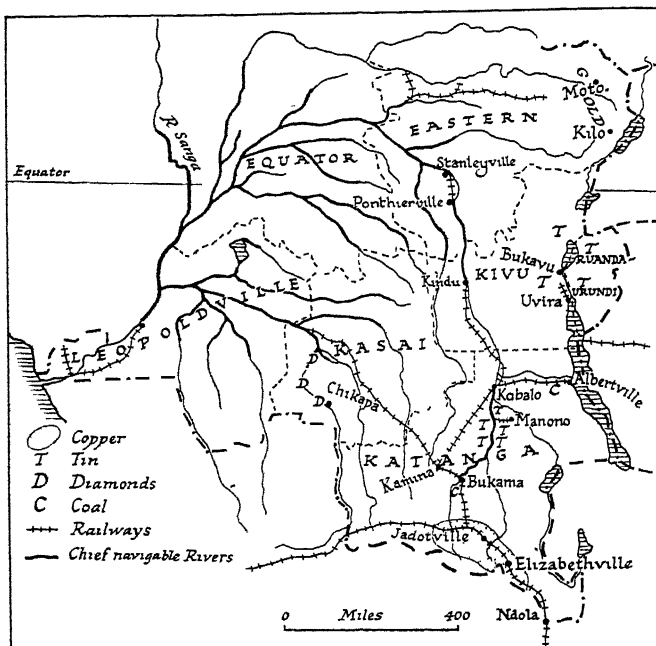


FIG. 114. THE CONGO—PROVINCES AND MINERALS

contributes to the world's limited supplies of uranium, and is rich in many other minerals. Mining operations in the Congo to-day employ many thousands of Africans. A valuable adjunct is the occurrence of water-power for the generation of electricity. When mining began in the early years of this century the district was completely isolated, and the exploitation of the copper deposits was on a very small scale. The main problems were connected with labour and communications. Production increased

when the railway from Rhodesia reached the area in 1910, but the importance of access led later to several other railway developments (see Fig 118). There have been many changes. The famous Star of the Congo mine, near Elizabethville, no longer yields copper, but is worked for cobalt, of which this region is a leading producer. The Kambove mine, farther west, is finished as an open-cast mine, and copper ore now comes from underground workings; this centre also produces cobalt, manganese, and zinc.

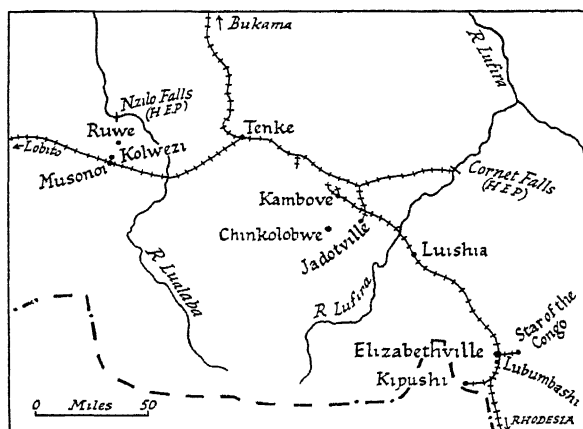


FIG 115 THE COPPER REGION OF KATANGA PROVINCE

The Kipushi mine south-west of Elizabethville is an important copper producer, with silver as a by-product. As these eastern mines decline increasing importance attaches to the Kolwezi area, west of the Tenke junction, with the important Musonoi and Ruwe copper mines. While Elizabethville still carries on smelting (the great Lubumbashi smelter is near by), Jadotville, which has absorbed the old centre of Panda, has developed into the chief town dealing with copper and other ores. Crude copper is exported in ingot form, in recent years exports have been of the order of 180,000 tons annually. Uranium ore, a rich pitchblende, comes from Chinkolobwe. Coal is mined at Luena, near Bukama, though it is of inferior quality, as also is other coal in the Lukuga

valley Iron is worked, and limestone for smelting is plentiful. Katanga, with its mining population, is served by the railway from Rhodesia with food-products and good coal and coke from the Wankie field. The mining development is mainly in the hands of the Union Minière de Haut Katanga. The capital of the Katanga province is Elizabethville, founded in 1910, it has more than 100,000 inhabitants, including over 10,000 Europeans. Besides its interest in minerals, it has a number of factories and is a centre for veterinary and other farming services, while it is important as a junction of air routes.

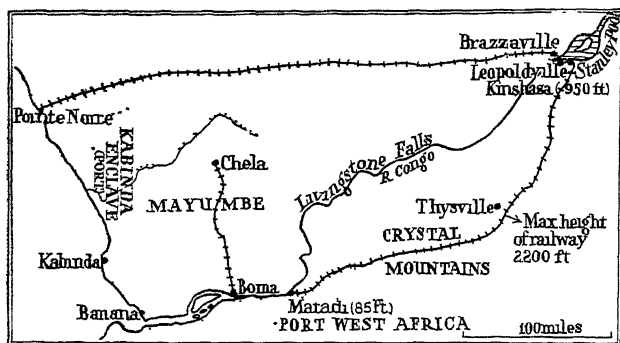


FIG 116. THE LOWER CONGO

Note the altitudes given. Mayumbe is part of the district known as Bas Congo, which includes Matadi and the Crystal Mountains.

Farther north in Katanga province, and again in Kivu and Ruanda-Urundi, are important resources in tin ore, there is a substantial production, and some ore is smelted locally as at Manono. Reef gold is mined in the Kilo and Moto districts of the Eastern province, where alluvial gold is also found, hydro-electric power is developed in connexion with this activity.

The output of diamonds from alluvial workings in the Kasai basin increased so much that the former Belgian Congo became the world's largest producer. The diamonds, however, are mostly small and inferior stones, and are mainly useful for industrial purposes, only about 5 per cent are suitable for use as jewellery. The centre of the diamond fields is Chikapa.

Transport It is obvious that the full fruits of this economic activity are dependent upon the development of adequate communications and shipping facilities. Tugs draw trains of barges on the Middle Congo from Kinshasa to Stanleyville, and smaller vessels utilize the sections Ponthierville-Kindu and Kabalo-Bukama, the obstructions being avoided by railways, while another section of railway links the river at Kabalo with Albertville on Lake Tanganyika, where steamer transport gives access to the Central Railway of Tanganyika Territory. The main river is



FIG. 117. THE LANDING AT YANGAMBI

Yangambi is on the Congo, about 250 miles downstream from Stanleyville. It is the headquarters of an important institution for research into tropical agriculture.

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supplemented by numerous tributary waterways, the river fleet (some 1600 steamers and barges) has a carrying capacity of about 300,000 tons, and plies on over 9000 miles of river. Of enormous economic interest is the railway development. The railway reaching Katanga from Cape Town *via* the Rhodesias is continued to Port Francqui, a centre of agricultural development, this gives a way to the Congo *via* the navigable lower Kasai. This railway is to be extended to Leopoldville-Kinshasa. The railway from Lobito Bay in Angola reaches the Katanga line at Tenke, between Kambove and Bukama, this railway provides the most direct

route to the Atlantic, and therefore to Europe, and opened up Portuguese territory *en route*

There is a good deal of congestion on the Leopoldville–Matadi railway, as so much traffic has to pass through this bottle-neck, which climbs the Crystal Mountains to avoid the Livingstone Falls. It has the characteristics of a mountain railway, rising to 2200 feet near Thysville, and had originally a gauge of 2' 6". It has been improved and the gauge widened to 3' 6", should it

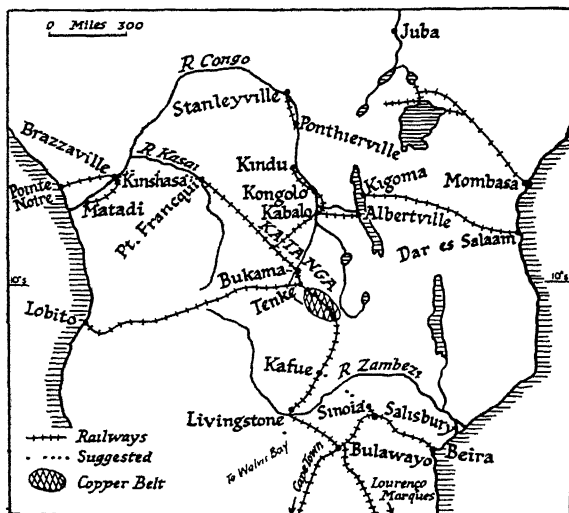


FIG. 118. RAILWAY RIVALRY IN CENTRAL AFRICA

The development of Katanga has led to considerable railway construction, and several ports are rivals for its traffic. The first export of copper *via* Port Francqui (Ilebo) took place in the middle of 1928 and from Lobito Bay in 1931. The French line Pointe Noire–Brazzaville was opened in 1934, but, of course, serves French Community lands.

be linked up through Port Francqui with Katanga a railway route of uniform gauge would be provided between the Congo mouth and Cape Town

From Elizabethville, in Katanga, to tidal water is 1600 miles or more, whether to Matadi or Dar es Salaam or Beira; two of these involve breaks of bulk, and the third is very indirect. The

Lobito-Katanga railway now provides the shortest way to a seaport—only 1300 miles from Elizabethville—and it ended the former export of Katanga copper *via* Beira and Dar es Salaam.

There is a number of short lines to serve mining or plantation interests, but the most notable railway, apart from those already described, is that in the Welle district from Aketi to Mungbere, serving the most important cotton area, which also has a big production of coffee. A railway link completed in 1955 between Kabalo and Kamina should promote development in the eastern part of the country. A short line runs northward for some distance along the Rift Valley from Uvira. The total length of the railways which, except for a few minor sections, are of 3' 6" gauge, is now some 3300 miles.

There has been a striking development of motorable roads, which now have a total length of 75,000 miles, of which 31,000 miles are described as main roads, some between important centres being of European standard. Similarly, great attention has been given to air transport, and regular services are maintained between important towns, the chief junctions being Leopoldville, Stanleyville, and Elizabethville.

Manufacturing Industry As might be expected, this has made most progress in the Katanga mining area, where, apart from hydro-electric and thermo-generating plants, there are engineering establishments and factories for making cement and bricks and tiles as well as soap and chemicals, notably carbide, sulphuric acid, and explosives. The beginnings of a textile industry are seen in cotton mills at Leopoldville and Albertville. Light industry is represented by cigarette factories at Elizabethville and Stanleyville and a few factories connected with brewing, mineral waters, and boots and shoes. The larger towns have workshops particularly connected with the maintenance of transport by rail, road, and river. Reference has already been made to saw-milling and the processing of rice and palm-oil, while there are many gunneries. Oil-cake production is important—palm-kernel, cotton-seed, and ground-nut cake.

A gigantic scheme is under consideration to harness the power of the Congo at Inga, 60 miles above Matadi, particularly for aluminum smelting.

Towns. Towns have grown rapidly, and reference has already been made to the chief ones that have developed in Katanga, as well as to some other centres. The capital of the republic is Leopoldville, now with 300,000 inhabitants, of whom only 16,000 are non-Africans. It is opposite Brazzaville, at the lower end of Stanley Pool, and incorporates Kinshasa, the river port on which converges the greater part of the export trade of the country, most imports also pass through it. It has large administrative functions, an important airport, and a number of factories (brewing, cottons, shoes, soap). Stanleyville is the capital of the Eastern province and deals with much rail and river traffic; Coquilhatville is the capital of the Equator province, with much river traffic converging on it along the Congo and other rivers; Bukavu (formerly Costermansville) is at the southern end of Lake Kivu (the surface of which is 4830 feet above sea-level), it is the administrative centre of the Kivu province, where the highlands have many white settlers specially interested in coffee-growing. Luluaburg, an agricultural centre, is the capital of Kasai province.

Of the territory's three deep-water ports (see Fig 116), Matadi, on the left bank, is the highest to be reached by ocean-going steamers. Great improvements have recently been made, and a few miles lower down a new harbour is now available at Ango-Ango, so that Matadi, incorporating Ango-Ango, is the chief port of the colony. Two oil-pipe lines are in use from Matadi to Leopoldville to supply oil for the use of steamers on the Middle Congo. One of the difficulties, now largely overcome, connected with Matadi is that the river has a difference of level between the dry and the wet seasons amounting to about 26 feet. Boma is on the right bank; a light railway runs northward from here to Chela, in the Mayumbe district. Up Banana Creek at the entrance to the estuary is the outport of Banana, which is now of little importance.

The Trust Territory of Ruanda-Urundi. This lies east of Lake Kivu and the northern part of Lake Tanganyika. It largely consists of Rift Valley highlands, including the volcanic Mfumbiro group. It has an area of nearly 21,000 miles, and its estimated population of over 4 millions, fully one-third of that of the republic, reflects its suitability for human occupation as compared with the

latter region. With over 5000 Europeans, there has been a certain amount of white settlement. Soils are generally rather poor, but progress has been made with coffee and with the breeding of cattle and sheep, for which purpose some stock has been introduced from the similar highland region of Kenya. The wealth of the Africans is mainly in cattle, and livestock and hides are exported; they have been encouraged to take up cash crops, notably cotton and coffee. There is a significant production of tin ore. The



FIG. 119. THE KING BAUDOUIN STADIUM, LEOPOLDVILLE

In the middle-ground are African sections of the city, with the river Congo beyond

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territory was formerly administered with the Belgian Congo, and separate trade figures are not available. There is a good mileage of motorable roads, and educational and other social services have been built up. Usumbura, on Lake Tanganyika, is the local administrative centre, its population includes 2000 Europeans.

Trade. The agricultural and mineral development that has been described ensures a large trade. Mining accounts for large imports of machinery (much from the U.S.A.), transport for the import of motor vehicles, tractors, petroleum, and bicycles. Coal, coke, and live cattle are imported from Rhodesia, mainly for Katanga. Large quantities of cotton piece goods are included among many

imported manufactured commodities. Regarding exports, fluctuations in prices lead to varying proportions in the values of minerals and vegetable products, but the latter may rival the former in value. Copper may account for up to a third of the export values, gold, diamonds, tin, chrome, and uranium ores also making substantial contributions. A very large proportion of the mineral export goes to Antwerp. Cotton, mainly sent to Belgium, usually leads the agricultural exports, closely followed by palm-oil and coffee. Timber, copal, rubber, cocoa, palm-kernels, *jute congolaise*, oil-seeds, and cake also figure among the exports, which may include rice and maize. About half the total trade is with Belgium, exports go to many countries, and the U.S.A. and the countries of Southern Africa provide substantial shares of the imports.

More than half the total tonnage of imports and exports passes through Matadi, which handles most of the typical vegetable exports, as well as more than half of the copper. Lobito is used for the export of much copper and other minerals; some coffee goes out *via* Dar es Salaam. Boma, the capital until 1927, mainly serves the Bas Congo area.

ANGOLA

Portuguese West Africa, Portugal's largest possession, covers nearly half a million square miles, and has a population of 4,400,000. Of these some 80,000 are whites—mostly Portuguese—some of whom were born in the colony, and 30,000 are half-castes; there are also some 30,000 'civilized' Africans who have acquired complete citizenship. Portuguese traders have frequented this coast since 1575. The territory includes the Kabinda *enclave*, some distance north of the Congo mouth, which also had its origin in early Portuguese trading interests. The Bihé plateau, rising to well over 5000 feet, with maximum elevations up to 8000 feet, has a rainfall that probably exceeds 50", and drains to the Congo, the Zambesi, the Ngami depression, and the Atlantic, the chief rivers flowing to the Atlantic being the Kwanza and the Kunene. Temperatures are tropical, somewhat modified in the higher parts and along the coast, where the cool current flows. The prevailing wind is off-shore, and the rainfall is chiefly in summer, so that varying types of savanna vegetation prevail,

there being only a relatively small amount of forest, chiefly in the north and north-east and on the western scarps of the higher plateau areas. The coastal rainfall is remarkably low, varying from 20" in the north to a mere 2" in the south; the resulting vegetation changes from scrub in the north to desert in the south.

Products. For nearly three centuries Angola was the reservoir from which slaves were obtained for Brazil. The abolition of the slave-trade necessitated change, and deliberate settlement began. While plantation activity went on in the hinterland of Luanda farmers settled in the Huila plateau, farther south. The railway from Katanga to Lobito has opened up large areas of the Bihé plateau for farming, typically cattle-raising, and maize and tobacco cultivation.

The crops grown by the Africans vary somewhat with the climatic regions, but generally include manioc, maize, beans, ground-nuts, and tobacco. They collect beeswax and, especially on the interior plateau, raise cattle and sheep. The small Kabinda area yields a little cocoa and palm-oil, there are important coffee plantations, especially in the Cazengo district, 200 miles east of Luanda, and round Porto Amboim. Tobacco is widely grown, sisal has been introduced, and, largely with the aid of irrigation in the south-west, sugar and cotton are cultivated, the former more successfully than the latter. Fishing is important along the coast.

The mineral wealth is probably great; it includes malachite, copper, iron, and gold, but the most important mineral export in recent years has been diamonds, mostly of industrial quality; the field, which is in the Lunda district, is an alluvial one and continues that of the Congo. Salt is obtained from coastal lagoons.

The Portuguese Government has laid plans for the substantial development of the territory, envisaging active mineral exploitation, the extension of railways, the colonization of the Kunene valley (based on irrigation to be controlled from a dam at Matala), and hydro-electric schemes to serve Luanda and Lobito-Benguela, the project for Luanda has been completed.

Towns and Railways. Luanda (formerly called São Paulo de Luanda, population 140,000, including 20,000 whites) is the capital. It has a fair harbour, a little light industry (soap, tobacco), and an important line running eastward through a fertile area to

Malanje. Lobito has a fine natural deep-water harbour protected by a long sand-spit, with modern facilities for shipping. It was formerly a great slaving-centre, and has considerable oyster-fisheries. Its railway, of 3' 6" gauge,¹ runs to the Katanga bound-

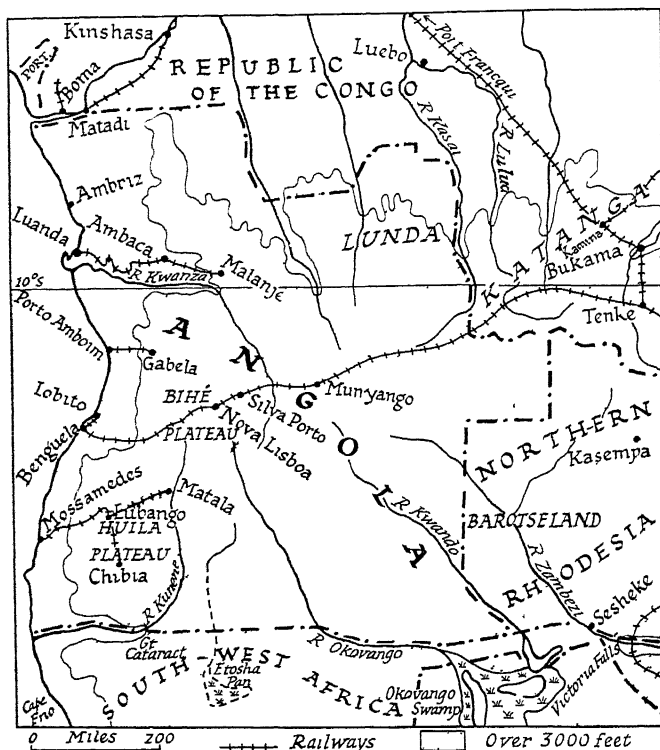


FIG 120 ANGOLA

The line from Lobito Bay roughly follows the Congo-Zambezi divide, it reaches a maximum height of over 6000 feet in the Bihé plateau

ary, whence it is continued to the Tenke junction. The Lobito railway has become very important, not only because it serves the great mineral district (p. 270), but because already it is opening

¹ This is the standard gauge of the railways of Southern Africa

up what may well become a vast farming area on the Bihé plateau. The railway, too, for the most part traverses high ground, and should be relatively free from floods. It first goes to Benguela, an old port with an open roadstead, and, after passing through an arid belt about 120 miles wide, reaches the higher and better-watered plateau. The wetter plateau slopes grow coffee, sugar, sisal, and cotton, while maize production on the plateau itself has rapidly expanded, and wheat is a winter crop. Cattle-rearing is general on the Bihé plateau, and a considerable African population is met with. The railway workshops are at Nova Lisboa, which has grown up with the railway, and is the centre of important roads, including the main road to Rhodesia. Nova Lisboa is also known as Huambo, and is spoken of as the future capital of the territory. Silva Porto, farther east, is in one of the best cattle and agricultural areas of the plateau. The greatest height reached by the Benguela railway is 6081 feet.

A light railway has been constructed from Porto Amboim to serve a district of increasing importance for coffee and cotton. Mossamedes is a centre for irrigation sugar and cotton, besides having a fish-curing industry. It has a short railway of metre gauge, passing through the coastal dry belt to the Huila plateau, where there are a number of Boer colonists.

Trade. In recent years this has steadily progressed, and railway development, the growth of plantations, notably coffee and maize, and of cattle-rearing by European interests, have contributed to the improvement. The imports notably include textiles, large quantities of coffee are exported, diamonds being next in value, followed by fish flour, maize, and sisal. Preferential treatment restricts the bulk of the trade to Portugal.

CHAPTER VIII

EAST AFRICA

GENERAL CONSIDERATIONS

ZANZIBAR occupies a central position on the coast of this region, which lies roughly between 5° N. and 15° S latitude, and stretches across to the western branch of the Rift Valley.

The relief runs in parallel belts from north to south. In the west is the long and broad Lake Plateau, somewhat diversified in altitude, but with an average elevation of about 4000 feet. To the east of this is the section of the Great Rift Valley system extending (though interrupted) from Lake Rudolf to Lake Nyasa—both of which have a surface-level of about 1560 feet—and to the west the branch passing through Lake Tanganyika to Lake Albert. In Kenya the Rift Valley floor rises to over 5000 feet, but in Tanganyika Territory it is much lower, as where Lake Natron is situated, and not always clearly defined. The Rift Valley is discontinuous south of this, but reappears in the upper valley of the Ruaha river. In Kenya the valley shows very steep escarpments, which in parts considerably exceed 8000 feet and form a difficult barrier to communications east and west. The great extent of the subsidence of the Rift Valley in some places is indicated by the fact that the deepest parts of both Lakes Nyasa and Tanganyika lie below sea-level. The volcanic peaks of Kenya and Elgon—the former snow-capped and with seventeen small glaciers—rise respectively east and west of the Eastern Rift Valley. Farther south is the volcanic peak of Kilimanjaro, the highest point of Africa (19,320 feet), with its ice-capped crater. On the eastern side of the Rift Valley the plateau continues, until it falls in terraces to the coastal plain, which, except in Kenya, north of Mombasa, where it is much wider, has an average width of about 45 miles, though it expands somewhat in the hinterland of Dar es Salaam. Apart from the volcanic rocks chiefly associated with outpourings on the

borders of the Rift Valley,¹ the geological formations are chiefly of the ancient crystalline rocks so characteristic of Africa, but rocks of Carboniferous age occur in the coastal plain. The rocks seem to be rich in minerals, but lack of detailed knowledge as well as very difficult conditions, resulting in poor communications, prevent any considerable exploitation at present. The mineral wealth includes gold, tin, copper, lead, diamonds, and some coal.

The drainage of the Lake Plateau and the Rift Valley system is somewhat complex. Into Lake Victoria drain several streams, of which the Kagera, coming from the west, is the largest. Lake Victoria is the great reservoir for the Nile, which descends the Ripon and Owen Falls,² and, after draining the Kioga lake and swamp area, drops to the Rift Valley over the Murchison Falls, then joining Lake Albert, Lake Albert is a second reservoir for the Nile, and is fed by the Semliki river from Lake Edward and the great crystalline, glacier-clad mountain-mass of Ruwenzori, or the "Mountains of the Moon" (p. 287). There are some areas of inland drainage mainly connected with the Rift Valley (*e.g.*, Lakes Rudolf, Magadi, Natron, Rukwa), and Lake Tanganyika, with its surface at about 2500 feet, only occasionally discharges to the Congo by the Lukuga. In the east of the region the drainage is towards the Indian Ocean; the more noteworthy rivers are the Tana (fed by the snows of Kenya), Pangani, Rufiji, and Rovuma. Deltas have been formed at their mouths, since, owing to the narrow continental shelf, there is only a small tidal effect. Off the coast are many islands, partly alluvial and partly coral, and coral reefs, broken opposite the mouths of the rivers, lie off parts of the coast. The rivers of East Africa are of little use for navigation, though the Nile provides a waterway between Lake Albert and Nimule, and the east-coast rivers have short navigable stretches near their mouths. On the other hand, the great lakes supply very valuable means of communication.

Climate. The variety of relief gives rise to great differences in temperature, and relief and latitude combine to bring about differences of rainfall, so that a rather complex arrangement of climatic regions is found. The vertical sun is experienced every-

¹ There is little volcanic activity to-day.

² The Ripon Falls are now submerged behind the Owen Falls dam.

where twice in the year, and two periods of rainfall result, except in the south, where the two are merged into one rainy season, and

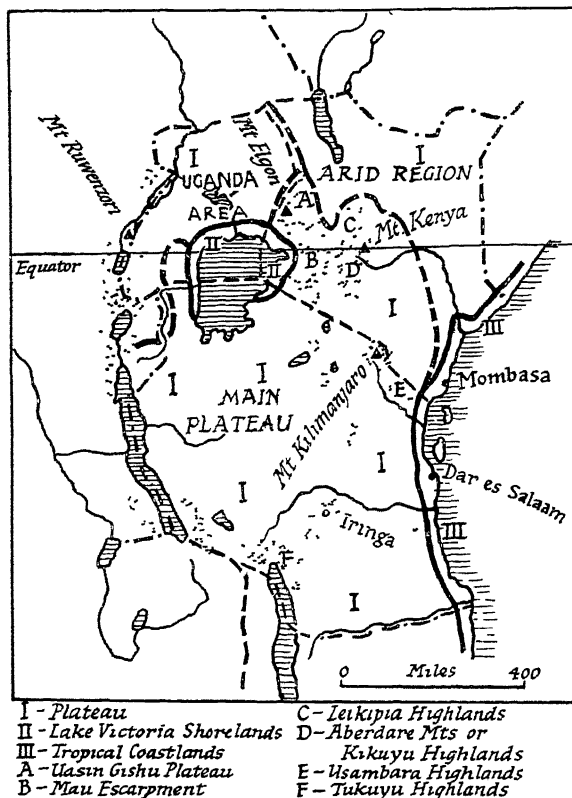


FIG. 121 REGIONS OF EAST AFRICA

along the equator by Lake Victoria, and in the highest parts, where there is considerable precipitation all through the year.

The latitudes give to the northernmost part of the region a northern hemisphere régime, the main part of it, however, has a

southern hemisphere régime. Variations, due to local conditions, include the 'rain shadow' effect in the Rift Valley, where katabatic winds are common, the effects of high altitude on temperature and rainfall, and the influence of the great expanse of Lake Victoria upon humidity and rainfall.

Of great importance is the double passage of the inter-tropical front, which gives rise in the equatorial belt east of the Eastern Rift Valley to the 'long rains' of March to May, preceded by the hot season with comparatively little rain, and the 'short rains' around November, between the two rainy periods is the cool season, not without some rain yielded by convectional storms, and with the likelihood of night frost above about 8000 feet. Another feature of the region is the unreliable rainfall, except round the west and north of Lake Victoria and by the western branch of the Rift Valley, which is influenced by the humidity of the Congo region. In the northern summer the south-east trades become the south-west monsoon as they reach the equator, sweeping towards Asia on a course broadly parallel to the coast, in the southern summer the region is largely under the influence of the north-east trade or monsoon, also broadly parallel to the coast, though at this time the southern part of the region has its rainfall associated with the inter-tropical front. The general aridity of the north-east of the region is connected with the wind régime described.

A simple division of East Africa is shown in Fig 121. The plateau which forms the bulk of the region has as its main part an area receiving generally some 30" to 40" of summer rain, with a well-marked dry season. A great area centring on Dodoma has less than 30". Tabora, at 4151 feet, has a mean annual temperature of 73° F, an annual range of 8° F, and 31" of rain, with a dry season from May to October inclusive. A zone of higher ground running north-east from Lake Nyasa and including the Iringa highlands and the Uluguru Mountains has up to 60". While in general the main plateau may be described as a savanna area, the rainfall, which largely comes in convectional storms, is very unreliable, and over large tracts the vegetation is marked by stunted, drought-resisting trees and thorn-bush. Soils are only locally fertile, large areas have very few people, surface or

accessible ground-water is scanty, tsetse is prevalent over the greater part. Conditions are better towards Lake Victoria, where in parts a dense agricultural population is found.

The Uganda section of the plateau has a generally higher and much more reliable rainfall, showing two maxima; its greater humidity leads to lower daily and annual ranges of temperature than occur on the main plateau. It is a savanna area with many trees and has been rendered more open by shifting cultivation in the past. There are also great stretches of grassland, and generally the area has some of the characteristics of derived savanna. Towards the north-east the rainfall declines, and the savanna becomes less favourable. It will be noted that a tongue of what has been called the main plateau projects into South-western Uganda, this is an area of lesser rainfall which, however, is greater than that of the extreme north-east.

The arid zone has broadly less than 20" of rain, a great area in the north with less than 10" stretches from west of Lake Rudolf eastward across Kenya. Except in the west of this arid zone, the elevation is less than that of the main plateau. In Southern Kenya this zone is a strip about 45 miles wide, known as the Taru jungle, separated from the coast by a belt of forest. Over most of the area the porous soil has only an incomplete cover of thorny and fleshy plants with some grass; it has a small nomadic population.

The lake shores of Victoria—west, north, and north-east—have abundant rain, over 60" in places, derived largely from evaporation from the lake surface, the conditions are equatorial, modified by elevation. Entebbe has a mean annual temperature of 71° F, an annual range of 3° F, and about 55" of rain, with a double maximum and no dry season. This zone is densely populated by sedentary agriculturalists with consequent modification of the natural forest cover.

The highlands, where they rise above about 5000 feet, have large areas upon which white settlement is or may be established. Nairobi, in the Kenya Highlands, illustrates the conditions with a mean annual temperature at 5450 feet of 63° F., an annual range of barely 7° F., and a rainfall of 35", showing the 'long rains' and 'short rains' already described. The rainfall, it will be noted, is

moderate in amount, it is also rather unreliable. Locally in the Kenya Highlands the rainfall is substantially higher, as it is in the Kilimanjaro-Usambara area, on the Iringa and Tukuyu Highlands, and on the highlands by the Western Rift Valley. The most compact area of this type is the Kenya Highlands, where should be noted (a) the Mau Escarpment, continued northward into the Uasin Gishu Plateau, (b) the Leikipia and Kikuyu Highlands east of the Rift Valley (the Kikuyu Highlands are often known as the Aberdare Mountains), a large portion of the Rift Valley itself exceeds 5000 feet in elevation. Connected with this area are the high volcanic peaks of Elgon and Kenya. It is in this great highland area and in the Meru-Kilimanjaro-Usambara area that white settlement is most firmly established. The isolated Iringa and Tukuyu Highlands offer similar opportunities, as again do the highlands bordering the Western Rift Valley. There is still much discussion of the fundamental suitability of these highlands for permanent white settlement. the lower air pressure may in the long run be an injurious factor, the climate shows a certain monotony, modified to some extent by a considerable daily range of temperature, necessitating warm clothing at night, insolation is very powerful and, though much moderated by cloud, may have serious nervous effects, and prolonged manual labour may not be possible. These points suggest problems that longer experience of white settlement should solve.

The vegetation of the highlands naturally varies with elevation. The middle slopes up to about 12,000 feet are usually forested, but there is often a good deal of grassland; above are shrubs, specialized plants, and mountain pastures with the snow-line at about 16,000 feet.

The coast zone has generally an equatorial type of climate, with a rainfall mostly exceeding 40", though north of the Tana mouth it declines rapidly. In the south of this zone a dry season is prominent (Lindi has four months with little rain). Both Mombasa and Dar es Salaam have their rainiest period in April and May, with a tendency to a second maximum at the end of the year, though their periods of least rain—a short dry season—do not correspond. These places have much the same mean annual temperature (80° F. and 78° F. respectively) and the same annual

range of 7° F. There are extensive coastal mangrove swamps, behind which, somewhat adapted to a dry season, is forest, largely cleared for cultivation.

Development. The Portuguese reached this region towards the end of the fifteenth century, and their efforts to maintain themselves north of the Rovuma river brought them into conflict with the Arabs, who finally frustrated them early in the eighteenth century. Exploitation of ivory, both white and black, was a main interest of the Arabs, and the principal connexion of the coast with the hinterland was, under their control, concerned with this trade. The modern exploitation dates from the charter given to the Imperial British East Africa Company in 1888, which was followed by the transfer to the Imperial Government of Uganda in 1894 and of Kenya in 1895, and from the charter given to the German East African Association in 1887, the German protectorate being declared in 1889. In each case the primary importance of communications is brought out by the fact that the first section of the Usambara Railway was completed in 1893 and the Uganda Railway in 1901, while the Central Railway of Tanganyika reached Tabora in 1912 and the lake in 1914. The importance of motor-cars, buses, and lorries is very great, having largely superseded other forms of transport (apart from railways), while bicycles and motor-cycles find a market among the Africans. Important air routes pass through this region, including the main route from Britain to South Africa; Entebbe and Nairobi are specially significant air centres.

The productions vary with the climatic regions. Tropical cultivation prevails in the coastal districts, where coconuts and sugar are notably important; these are largely old-established Arab crops. The plateau is a stock-rearing area, with typical savanna crops, such as ground-nuts, maize, millet, and sesame. It is white influence and white settlement in the highlands that have raised the commercial importance of this region, and efforts have been particularly concentrated on coffee, sisal, and maize, while recent mining development has been important. At the same time, African cultivation has greatly expanded, particularly round Lake Victoria where cotton and coffee, especially the former, are notably important.

Bantu tribes form the majority of the inhabitants, but there are also a number of Hamitic Negro types, including the Masai, with a large sprinkling of Arabs and Indians along the coast and in the towns, where the chief trading language is Swahili, a modified Bantu tongue. The existence on the plateau of both agricultural tribes (such as most of those of Uganda, the Kikuyu of Kenya, and Bukoba of Tanganyika Territory) and pastoral tribes (notably the Masai) should be noted



FIG. 122. SISAL

East African Office

The three territories comprised by this region have differing political status—Uganda is a protectorate, Kenya a colony, and Tanganyika a trust territory. White settlement is an influential factor in Kenya, of little significance in Uganda, and of limited importance in Tanganyika. The method of indirect rule has been generally followed, great strides have been made in African participation in government, and independence, perhaps in a Federation, seems pending for these territories. The problems associated with 'plural societies' are most urgent in Kenya, not only because of its larger European community but because of substantial Arab and Indian populations relatively homogeneous in contrast with the scattered tribal organizations of the Africans. The position is further complicated by the increasing pressure on

the land through growing population and soil erosion in many African areas, and by the expanding urban population.

The majority of the Europeans are not permanent settlers, engaged in planting and farming. A large proportion are officials or missionaries, many are concerned with mining, transport, industry, and commerce so that the numbers working their own farms or holdings is relatively small. In Kenya such farmers with their families make up about one-third of the European population, while another third lives in Nairobi. Moreover, the Europeans have varied origins, and, while in Kenya they are of mainly British stock, there are many Afrikaners, notably round Eldoret, the Italian element is also significant. There are many Germans in the principal white area of Tanganyika—a legacy from the time when this was a German colony—but there are appreciable numbers of others, including Afrikaners and Swiss. The Indian population largely consists of clerks, skilled workers, shopkeepers, and small traders, and lives mainly in the towns. The majority are Hindus, but there are many Mohammedans. The Arab element is mainly coastal and is, of course, Mohammedan. Dominating these racial elements in numbers are the Africans, divided into scores of tribes—many small—for the most part scattered, untrained, and inarticulate. It is clear that the goal of racial co-operation in East Africa is beset with many difficulties.

At the same time, a form of federalism has developed for services of common interest under the East Africa High Commission, which functions from Nairobi. It has a legislative assembly the membership of which is drawn from four races. Its functions are varied: posts and telegraphs, steamer and road transport, railways and harbours, civil aviation, come under its supervision; it organizes research into medical, agricultural, and veterinary problems; it is concerned with industrial development, meteorological records, and a variety of other matters, including the organization of international action for locust control. The three territories have been for a long time in one customs union.

UGANDA

After being controlled by the Imperial British East Africa Company, this area became a protectorate in 1894. It covers

about 94,000 square miles, including 13,600 square miles of water and swamp. The population is over $5\frac{3}{4}$ millions, including 58,000 Asiatics (mostly Indians) and 8600 Europeans; a small number of the last are settled on leased Crown lands in the higher areas of the west and east. Recent development schemes—hydro-electric and mining—have led to a substantial increase in the European element, the Indian community has greatly advanced in numbers. The Africans include Negro and Hamitic types, but more than half are Bantus. Uganda is plateau in character, but the eastern part contains the highland area of Mount Elgon, and the Rift Valley in the west is bordered by the Toro plateau, dominated by the Ruwenzori range (the “Mountains of the Moon”), on the eastern flank of which is a little-touched region of extinct craters, small lakes, forest, and varied animal life. The Ruwenzori massif is shared with the Congolese Republic.

Climate and Production. Lake Victoria has some effect in modifying temperature, and “land and sea breezes” are common on its shores. The rainfall is largely convectional, associated with the constant high altitude of the sun. Human occupation has removed a great deal of natural forest cover, there is now very little closed forest, but a higher proportion of open forest; the chief area of the latter type is in the north-central part of the country. The forests¹ contain mvule (the most valuable timber, resembling teak in its qualities), mahogany, plantain, and bamboo. there is, however, no surplus of timber available for export overseas. Much of Uganda is grassed; there is a large area of elephant-grass country (elephant-grass is long), stretching from the north of Lake Victoria to Lake Albert, which, left uncultivated, becomes closed forest. There is also much short-grass country lying particularly north and north-east of Lake Kioga and again in the Ankole district, left unused, this becomes open forest. The short-grass country notably provides the chief cattle-raising areas of Uganda, and for the protection of this occupation drastic tsetse-control measures have been taken, and some millions of acres have been ‘reclaimed’ by cutting down the vegetation in which the tsetse fly flourishes, by killing off game which spreads

¹ The Uganda forests resemble in both appearance and species those of West Africa, and differ from the characteristic forests of the Kenya Highlands

the infection, and then planting lemon-grass and acacia-trees. These measures, together with the control of rinderpest and other diseases, have led to a remarkable increase in the numbers of

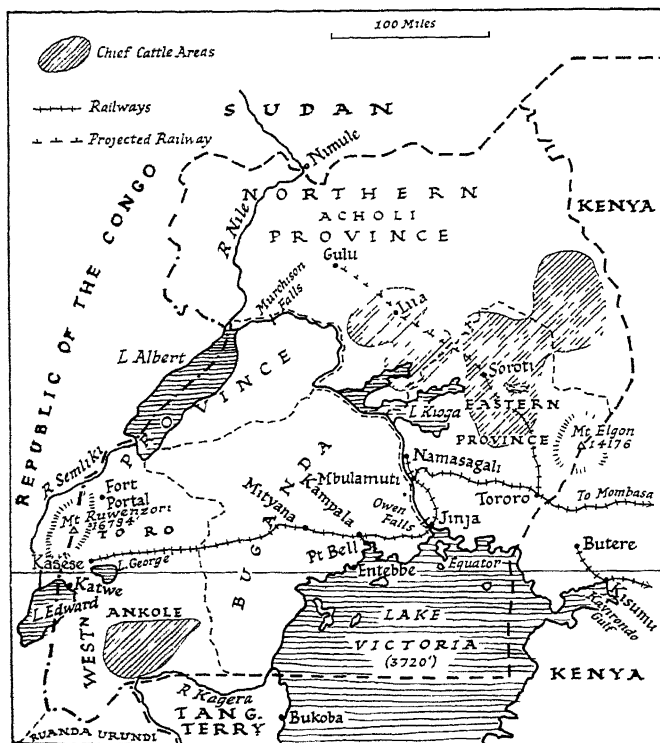


FIG. 123. UGANDA

cattle (now $2\frac{1}{2}$ million), and the quality of the hides and skins produced has been much improved.

The Africans are good cultivators, and sedentary farming is well established. Food crops include bananas (which also provide fibre and a sap from which soap is made), cassava, rice, maize, beans, peas, and sweet potatoes. The development of cash crops

has been remarkable, they include cotton, coffee, ground-nuts, maize, sugar, castor, tea, and sisal. Of these, cotton and coffee are of leading importance. The first considerable planting of cotton took place in 1906; to-day nearly 2 million acres are under cotton (American upland type), grown exclusively by Africans often organized in co-operatives for both the growing and the ginning of the crop, which chiefly comes from the Buganda and Eastern Provinces, *i.e.*, west and east of the Victoria Nile. Coffee has also made remarkable strides, some—of both *arabica* and *robusta* varieties—is grown by European planters principally in the Toro district, but the bulk of each variety is now grown by Africans; some three-quarters of the total crop is *robusta*. Most of the *arabica* is grown by African producer-co-operatives in the Bugisu district adjacent to Mount Elgon. There is a substantial production of sugar from two large estates on the northern shore of Lake Victoria, this production is mainly in Indian hands. There is a small crop of tea from European plantations by Mount Elgon; attempts to establish cocoa have not been successful. Tobacco as an African crop has been encouraged; oil-seeds, especially cotton seed, figure in the exports. Maize, chiefly grown in the cotton areas, may also provide an export surplus. It is of interest that schemes for the mechanized preparation and planting of fields are being studied, and a tractor-hire scheme is in operation.

The mineral wealth is assuming great importance. The occurrence of valuable minerals has long been known, but until recently a little gold and tin ore from the Ankole district represented the chief production. To-day attention is concentrated upon (a) the Kilembe area in the Toro district, where a rich copper-cobalt mine commenced production in 1956, assisted by a railway from the east and electricity from the Owen Falls power station, (b) the 'Tororo complex' on the eastern border, where there are large deposits of iron ore and apatite; columbite (niobium ore) also occurs here. Other mineral wealth is known, among which may be mentioned lead, now being worked in the Ankole district. Salt has long been obtained from an intensely saline crater-lake near Katwe in the Western Rift Valley.

Industrial Development. Uganda's industries have been mainly

concerned with the processing of raw products—cotton, oil-seeds, coffee, sugar. There are numerous ginneries, mainly in Indian hands, though African participation in this is growing. There are two sugar factories in the Kampala-Port Bell area. The Owen Falls hydro-electric scheme, opened in 1954, is being rapidly completed, this scheme is designed to promote industry. Jinja is a growing industrial centre; its factories include one for bricks and tiles and the first cotton mill in East Africa. It smelts the copper-concentrates from Kilembe. A modern cement factory at Tororo met the large requirements for the Owen Falls dam. Further industrial development is being planned, including iron and steel works at Tororo, and, to ensure African participation, a technical college is being established at Jinja.

Towns and Communications. Uganda is an inland country, and its development must depend upon the provision of transport facilities. Before the protectorate was established the Africans had created what was, for Africa, a considerable road-system. There is now a big mileage available for motor-transport in all weathers. Until the beginning of 1928 Uganda's chief connexion with the outside world was by what was formerly called the Uganda Railway, which runs in Kenya from Kisumu to Mombasa—a single metre-gauge line which became seriously congested when the cotton crop was being transported. The cotton centre of Namasagali on Lake Kioga was connected by rail (originally called the Busoga Railway) with Jinja, which port formerly sent much cotton by steamer to the Kisumu terminus. Now there is a direct connexion between Mbulamuti on the old Busoga Railway *via* Tororo with Nakuru Junction on the Uganda Railway, and this, by avoiding the break of bulk at Lake Victoria, has greatly eased the transport problem. Moreover, Kampala (population 40,000), often called the commercial capital of Uganda, is connected by rail with Jinja and, by a new line, with Kasese, near Kilembe. Kampala is a large market-town in a district producing cotton, coffee, and sugar; it is the capital of the important Baganda people, and has a short railway link with Port Bell on the lake. Old Kampala was located within a ring of hills, the chief buildings (including Makerere University College) are on the hills, and the rapidly growing town is filling the valleys between. Besides

various processing industries, Kampala is the centre for Uganda's coffee auctions, and has an important technical school.

From Tororo a branch line, the extension of which is planned to the cattle centres of Lira and Gulu in the Acholi district, runs through important cotton country to Soroti. The administrative centre is Entebbe, on Lake Victoria; it possesses a station for research into tropical diseases and has one of the most important airports in Africa. The second largest town in Uganda is Jinja (over 20,000 people); it is rapidly growing because of the industrial development referred to above, and is specially favoured by proximity to the Owen Falls power station.



FIG. 124. COTTON-PICKING, BUSOGA DISTRICT, UGANDA

East African Office

Motor-cars and -lorries and bicycles have become commonplace in Uganda. Several native 'kingdoms,' the chief of which is Buganda, are recognized, and development has been encouraged on lines similar to those followed in West Africa. The rapid development of the southern part of the country may be compared with that which has taken place in Ghana.

Trade The considerable production of cotton and coffee ensures a relatively large trade. The chief imports are cotton piece goods, rivalled in value by motor-vehicles (including tractors) and by machinery, apparatus, and appliances. Iron and steel

goods are also high on the list; other notable imports include rayon goods, paper and pulp, petrol, rubber, and chemicals. Coffee has now overtaken cotton as the leading export; copper, the third export, is far less important but is developing rapidly. Half the imports, by value, come from the United Kingdom; India and Japan between them send about a quarter. The United Kingdom is the leading customer, India takes much raw cotton, and the U.S.A. and West Germany are other important customers.

KENYA

Kenya is a Crown colony, except for some small coastal areas—part of the dominion of the Sultan of Zanzibar—which constitute a protectorate. It stretches from the Indian Ocean across the Rift Valley Highlands to the Lake Plateau, where it includes a small part of Lake Victoria, and spreads northward to include a large area of arid country. It covers about 225,000 square miles, of which over 5000 square miles are water. The population exceeds $6\frac{1}{4}$ millions, including over 63,000 whites, some 162,000 Indians, and 35,000 Arabs. A beginning has been made with multi-racial participation in government, and the European section's dominating position is weakening.

The physical features have already been dealt with; of outstanding importance is the compact area of highland upon which the white planters are settled.

Production and Settlement. About $2\frac{1}{2}$ per cent. of the area of Kenya is forested, and the bulk of the forest is in the highlands. A number of valuable trees occur, and already the need for re-forestation has arisen, although local demand and difficult transport to the coast militate against an export trade. The coast belt yields certain valuable hard timbers, as well as mangrove poles. At about 5500 feet are the muhuga-forests, unfortunately largely cleared for coffee; the muhuga-tree provides a hard, resistant timber, and plantations of it have been established. The next zone is that of the 'cedar'-forests (6000 to 9000 feet, on western slopes); there are several varieties of 'cedar,' one (actually a juniper) being suitable for pencil-making; this belt contains the most important of the trees of Kenya. The zone of

so-called camphor-forests, from 7000 to 9000 feet, receives an abundant rainfall, and the accompanying vegetation is luxuriant; the 'camphor'-trees provide good timber. From 8000 to 10,000 feet are the bamboo-forests, consisting of a single species, which would be available for the pulp industry. In addition to the forests there is an enormous area of more open land, suitable for mixed

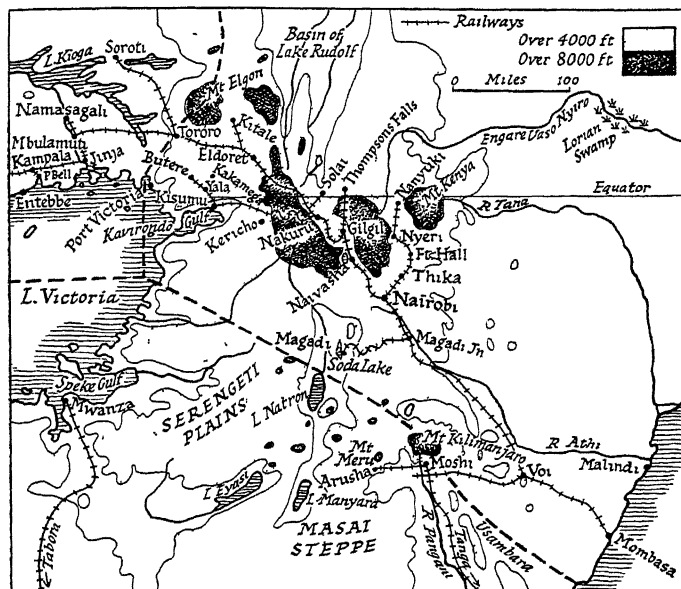


FIG 125 THE KENYA AND UGANDA RAILWAY

This map brings out the varying elevation of the Rift Valley and some of the lakes of inland drainage that mark it. The main line is from Mombasa to Kampala, via Eldoret, Mbulamuti, and Jinja.

farmings. The most important coastal product is the coconut-palm, long cultivated by Arabs, it has become an object of interest to European and Indian planters, and there is a small export of copra. Rice is increasing in importance, and some is grown in the lower Tana area where irrigation development has been contemplated. Other products include mangrove bark and poles, sugar, cotton of good quality, tobacco, and fruits such as the

banana and mango, as well as cassava. Most of these products are unimportant in the northern drier coastal region.

Some three-fifths of the area of Kenya is arid (see Fig. 121) and mainly waterless, supporting only a small population, chiefly nomadic. Elsewhere the plateau is mainly shared between the 'white highlands' and African reserves. Some 13,300 square miles of highland country have been alienated for white occupation; the African reserves total 52,000 square miles. By Lake Victoria the Africans are cultivators; the Kikuyu are cultivators but also raise cattle, while the Masai, who are not very numerous, are exclusively pastoralists and nomadic. Broadly speaking, away from Lake Victoria, cattle-raising is a leading interest in the native reserves; it is estimated that there are some 6 million cattle in the country. By the lake African crops are similar to those of southern Uganda, and cotton has importance, elsewhere the reserves have generally less rainfall, and typical crops include sweet potatoes, maize, millet, beans, simsim, and castor. While European farms contribute the bulk of the typical exports of Kenya, African production is making an increasing contribution, for Africans have been encouraged in recent years to take up cash crops. They grow most of the maize (chiefly in Northern Nyanza, south of Mount Elgon), they are now allowed to grow *arabica* coffee; they grow tea on the southern foothills of Mount Kenya, pyrethrum (e.g., near Thika, in the Kikuyu Reserve), sisal, wattle (wattle-bark yields an extract rich in tannin), tobacco, and pine-apples. Africans also grow some sugar, but this is mainly an Indian crop in the coast belt. The native cattle are of the zebu type; sheep and goats are raised (the latter being responsible for much soil erosion), and ghee (clarified butter), as well as hides and skins, are available for export.

A remarkable example of white settlement under the equator is provided by the alienated highlands (where settlement by non-European farmers is now planned). The Europeans actually cultivate only a relatively small part of this land and depend upon African labour. There is normally much migration, especially by Kikuyu and Luo people, to the Rift Valley and farms adjacent to it, but this labour is largely supplied by young men seeking temporary employment. A more stable labour-supply comes

from squatters whose work is paid for, at least in part, by being allotted some land for personal use. Pressure of population in the reserves is a factor in the movement of Africans to the European farms. Relatively temperate climatic conditions are added to a good and moderately reliable rainfall, there is a variety of soils, including volcanic and sandy areas, and the differences of elevation permit a considerable range of products.

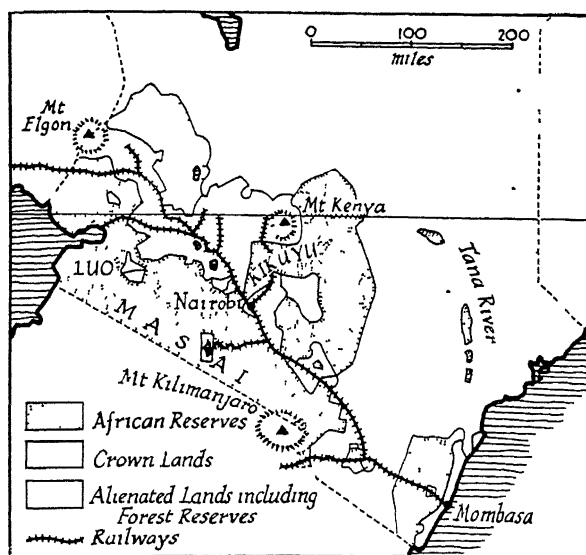


FIG. 126. KENYA—"THE WHITE HIGHLANDS"

This map is somewhat simplified, mainly by including the forest reserves with the alienated land. The forest reserves are chiefly Mounts Kenya and Elgon and the higher parts of the Rift Valley Highlands. The alienated coastal strip includes a little forest reserve (in the Kenya Protectorate).

Coffee is the crop at present of greatest economic importance to the white settlers, its acreage having rapidly increased, especially in the Kikuyu Highlands. Wild coffee occurs, but the *arabica* variety is chiefly cultivated, the best elevation being about 5000 feet; the coffee is of good quality. Sisal, cultivated in the Nairobi district up to 7000 feet, usually provides the second most

valuable export, Voi is another important centre. Maize, grown at various elevations, comes chiefly from the Kitale district, its quality is good. Research has developed excellent rust-resisting wheats, which are cultivated above 6000 feet, chiefly in the Nakuru area and on the Uasin Gishu plateau, the crop is largely absorbed locally. The cultivation of tea of good quality is carried on, notably round Kericho and west of Nairobi. Pyrethrum (a member of the daisy family from the flowers of which an insecticide powder is made) is extensively cultivated, Kenya pyrethrum

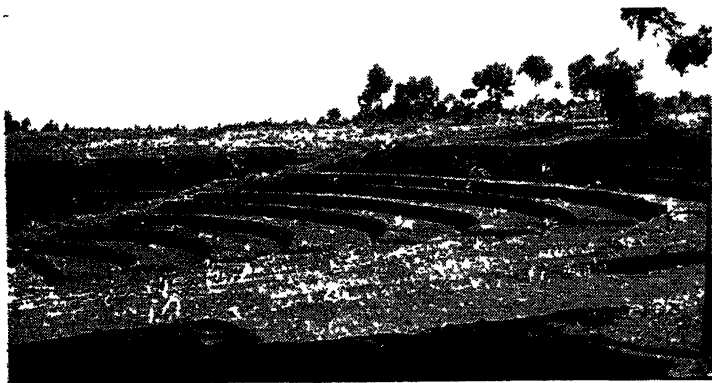


FIG. 127. BENCH-TERRACING BY COMMUNAL LABOUR IN THE KIKUYU RESERVE, KENYA

Soil conservation in the reserves is an urgent problem
Central Office of Information

has a high reputation, and the export is increasing in the form of pyrethrum extract. Sugar and bananas can be grown at the lower elevations, while temperate fruits, including those known as 'Mediterranean,' have been successfully planted, among fruits pineapples (for canning) and passion-fruit (for juice) have commercial importance. It should be noted that climatic conditions permit of cropping throughout the year. Too continual cropping in certain European districts has led to soil erosion.

Mixed farming by Europeans is expanding. The native cow has been improved by European farmers by the introduction of

pure-bred stock, and, besides the supply of butter to the local market, there is a small export of this product. Cattle can for the most part be kept out of doors all the year round. Kitale, Eldoret, Thompson's Falls, and Nakuru are among the dairying centres. The native sheep, of a poor type, has been improved by the introduction of merino and other types, while horse-breeding is also carried on. Pigs are another introduction, and bacon production is increasing. One of the difficulties of stock-rearing is connected



FIG 128. CONTOUR CULTIVATION ON A EUROPEAN FARM, SOLAI, KENYA

The crops are maize and wheat
Central Office of Information

with the native carnivores, but this is lessening with closer settlement. It may be noted here that in Kenya and East Africa generally are found the chief present-day opportunities for big-game hunting. Strict regulations govern hunting; the licences issued are a source of revenue. Hunters contribute to a significant tourist traffic. Malindi, growing as a tourist resort, is a base for hunting in the Tana valley to the north.

The principal European agricultural centres are Nakuru, situated at just over 6000 feet in the Rift Valley, and Eldoret, at

6875 feet, on the Uasin Gishu Plateau. These places show a little industrial development: Eldoret has, for example, a creamery, flour mills, and soft-drink and wattle-extract factories

Farmers, both European and African, are assisted by research stations and agricultural and veterinary services. The encouragement of African agriculture has become an important objective, and the attempt is being made to stabilize the nomadic Masai whose overgrazed lands can no longer support adequately their numerous cattle. The Europeans need African labour, but this is often far from adequate or efficient, and many who might be on the land are attracted to the growing towns. African production has made progress, but it is still mainly for subsistence, and the reserves are, broadly speaking, untouched by the railway, on the other hand, road development and motor-transport somewhat reduce this handicap. The increasing use of tractors and motor-vehicles renders the settler somewhat less dependent upon African labour.

Mineral development, apart from soda, is not very important at present. Lake Magadi, 30 square miles in area, in the Rift Valley, is filled with carbonate of soda; transport costs are heavy, but there has been for many years a significant export. There is a small output of gold—from the Nyanza Province—mainly reef, some comes from the Kakamega district, where in 1931 a portion of the North Kavirondo African reserve was alienated on the discovery of the mineral. There is some working of limestone, which is plentiful, for cement-making.

Industrial Development. This is handicapped by a general lack of fuel and water-power. By agreement, Kenya is receiving a share of the Owen Falls power. A good deal of processing goes on. the ginning of cotton, the preparation of coffee and sisal, the making of wattle-extract, and so on. Factories for light industry are found at certain European centres, notably Nairobi, which has a considerable industrial section concerned with, among other things, light engineering, coach-building, flour, biscuits, margarine, cigarettes, furniture, knitwear, and sacks. It is, of course, small-scale development, but illustrates a definite policy of industrial expansion. An industrial estate is being developed on the mainland opposite to Mombasa Island, near which is a cement factory,

another cement factory is in operation on the Athi river south-east of Nairobi. Meat-packing is carried on near both Nairobi and Mombasa. There is a number of Government technical and trade schools, and Nairobi has a technical college

Towns and Communications. Mombasa (100,000 inhabitants, including 2000 Europeans, more Indians than Arabs, and 50,000 Africans) is on the east side of the coral island of the same name.

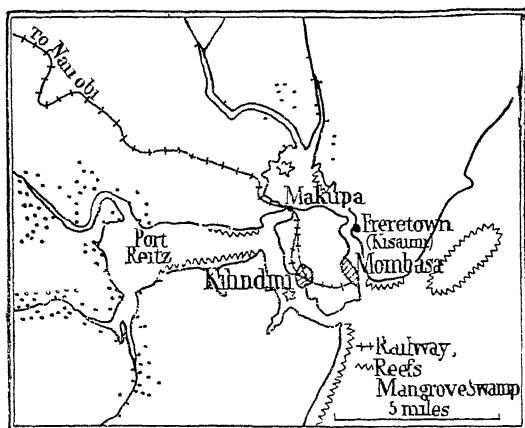


FIG 129 MOMBASA ISLAND

The railway crosses a narrow channel at Makupa

It was for some time the chief Portuguese base in East Africa. Its harbour is frequented by small steamers and dhows. On the south-west side of the island is Kilindini, a splendid natural deep-water harbour, now provided with modern shipping facilities and reputed the finest harbour in East Africa. Mombasa is the chief centre in Kenya for Muslim education. Apart from a large *entrepôt* trade, it serves as the great outlet and inlet for Uganda and Kenya Colony, as the Kenya and Uganda Railway runs from here through the most developed areas. The line runs through Voi, a junction for the Kilimanjaro district of Tanganyika Territory, and Magadi (the junction for a short and tortuous line to the Magadi soda lake) to Nairobi, the chief centre of white

settlement, whence a branch runs to the foot of Mount Kenya Nairobi (210,000, including 20,000 Europeans and 70,000 Asians) is the administrative centre from which many roads radiate; also a branch railway runs to Nanyuki at the western foot of Mount Elgon and serves the settlements of Fort Hall, Thika, and Nyeri Nairobi has growing administrative, commercial, and industrial activities as well as a busy international airport, and has grown to be the largest urban centre in East Africa. Beyond Nairobi the railway crosses the Rift Valley, in which Gilgil and Nakuru are situated. From a little beyond Nakuru the former main line goes to the lake port of Kisumu, while the present one goes on through Eldoret to link up with the old Busoga railway in Uganda. A branch from this main line serves the European centre of Kitale, while the Kisumu line goes on to Butere in a district of important African farming. Two further branch lines may also be noted, both running to small European centres. one is from Gilgil to Thomson's Falls, the other from a point west of Nakuru to Solai.

Trade. The influence of the economically important European community is seen in the substantial imports of tractors and motor-vehicles, machinery and appliances and metal manufactures. These categories exceed in value that of cotton piece goods, which, however, is large. Petrol, fuel and other oils, chemicals, cement, and a variety of foodstuffs are other significant imports, nearly half of which come from the United Kingdom, other notable suppliers being the U.S.A., Bahrein, and India. Coffee is normally the leading export in value, followed by tea and sisal; wattle-bark extract, hides and skins, soda and pyrethrum are important. The United Kingdom is Kenya's leading customer, taking, like the U.S.A. and Western Germany, a good deal of coffee as well as other typical exports.

TANGANYIKA TERRITORY

This area is a British-administered trust territory and, except for a region round Lake Kivu administered by Belgium, covers the whole of the former German Protectorate of East Africa. The area is about 363,000 square miles, including 20,000 square miles

of water; the population consists of about $8\frac{3}{4}$ million Africans, 21,000 Europeans (including many Germans and a number of Afrikaners, notably in the Arusha district), 19,000 Arabs, and 83,000 others, mainly Indians. The territory is divided into eight provinces, with very different populations and resources. The density of population varies greatly, being notably high in some areas, *e.g.*, to the south-east of Lake Victoria, where it may reach 400 persons to the square mile, north-west of Lake Nyasa, and on



FIG. 130. TANGANYIKA TERRITORY

The high rim of Lake Nyasa makes it difficult of access, a gap at Manda may become important in the future, a railway to it from Kiloa has been proposed

the Uluguru Mountains, areas in which there is notable population pressure. In the Masai country by the Kenya border the density falls below 2 per square mile, while large tracts of the plateau are virtually without population. There are about 120 tribes, some little known, which are mainly Bantu but which include such different types as the Nilo-Hamitic Masai and in the Central Province tribes related to the Hottentots of the south-west of

Africa. Administration has followed the policy of indirect rule, but the social organization of the Africans in many areas has made it often difficult to find suitable 'native authorities.' Alienation of land—mainly to Europeans but also to Indians—has taken place, but not to the same extent as in Kenya.

The broad features of relief and climate have been dealt with earlier in this chapter. Among rivers of interest are the Great Ruaha (a tributary of the Rufiji) which cuts through the high eastern escarpment edges, and the Malagasari flowing to Lake Tanganyika and therefore draining to the Atlantic, bringing the watershed to less than 400 miles from the Indian Ocean. While the natural vegetation may broadly be described as savanna, there is a certain amount of closed forest, mainly by Lake Victoria where mvule (also called iroko) occurs, and on the slopes of the highland masses, where it resembles that of the Kenya Highlands. It may be noted here that the most easterly extension of the oil-palm occurs by Lake Tanganyika. The coastal forest is often described as bushland and thicket, with a variety of trees, including iroko, as well as mangrove in the tidal swamps. Woodland with savanna types of tree and grassland, sometimes with scattered trees and sometimes without, covers most of the plateau, the trees are usually gnarled and tough and difficult to remove, as was shown when land was cleared in the Kongwa area for the 'ground-nut scheme.' The dry season, the moderate rainfall over large areas, the generally high temperatures, and lack of surface-water mean that, broadly, the conditions should favour pastoral occupations rather than cultivation. Unhappily, tsetse is prevalent in a coastal belt 150 miles wide, and in the west is another stretch 300 miles wide, leaving only one-fifth of the country available for stock, and this area is over-grazed and often shows soil erosion.

The regions represented in Kenya are repeated in this territory, but the proportion of purely arid country on the one hand is much less, while on the other the amount of highland suited to white settlement is also less; moreover, the latter type of country is more scattered. A very large proportion of the whites are settled in the districts adjacent to the Pangani river, which rises in Mount Meru and passes the foot of Mount Kilimanjaro; this area received most attention from the Germans, and is served by

of sheep and goats are kept. Constant warfare is maintained by the Administration against *nagana*, rinderpest, and other stock diseases; and much has been done to improve the quality of hides and skins, which provide an important export. Ghee is produced, beeswax and a little gum arabic collected, and in the coast margins a little gum copal. Copra is produced by Arabs, Indians, and Africans in the coast belt, oranges are grown in a number of places, notably near Tanga, and the date-palm has long been cultivated by Arabs at Tabora, a former centre of the slave trade.

European development has taken place mainly on the Usambara Highlands and the slopes of Mount Kilimanjaro and Mount Meru, where Lushoto, Moshi, and Arusha are respectively the chief European settlements. Coffee is a leading interest, but sisal production in the Usambara area (together with that from plantations farther south in the Morogoro and Lindi districts) makes Tanganyika the leading exporter of this commodity. Some maize and wheat are grown on the mountain slopes, pyrethrum comes especially from the Arusha area, as also does a small production of sugar from lower elevations. Road and rail development from the port of Tanga serve this very productive part of the Pangani basin. Of other areas suited to white settlement that of Iringa has made most progress; coffee, maize, tobacco, pyrethrum, and tea are established crops—this district produces nearly all the tea grown in the territory. The Tukuyu Highlands show similar development on a smaller scale, while the Fife plateau, south of the Karema gap, has not as yet attracted white settlement.

In 1951 a scheme (popularly known as the 'ground-nut scheme') undertaken by the British Government to plant large areas in East Africa with ground-nuts, using modern equipment for land-clearing and cultivation, was finally abandoned. The greatest effort had been put into the Kongwa area, where physical and human difficulties, anticipated and unanticipated, together with weather vagaries, including both drought and flood, clearly showed the need to hasten slowly. Two other areas received attention—Urambo and Nachingwea. The development of the latter area was contingent upon the building of a railway from the coast, where a site, Mtwara, was chosen for a modern port. Ultimately the development of the areas mentioned as "experi-

mental agricultural areas" was decided upon; they are now the responsibility of the Tanganyika Government as a Colonial Development and Welfare Corporation scheme, while the new port and railway come under the control of the East Africa High Commission. A co-operative African tenants' scheme has been initiated in the Urambo district, involving tractor-preparation of the land and a variety of crops including ground-nuts, maize and, as a cash crop, tobacco; at Kongwa, where 90,000 acres were cleared, African farmers are steadily establishing themselves, and stock-raising is receiving much attention; in the Nachingwea area, perhaps the most promising of the three, the possibilities of small African farms and large European farms are being investigated. The schemes are being carefully supervised; rotation of crops (ground-nuts, sorghum, beans, millet, and others) is being studied; training in good agricultural methods is being given; and much is being learnt about the 'taming' of hitherto unused land and the improvement of African agriculture.

There is substantial mineral wealth. Reef gold is worked in various districts east and south of Lake Victoria and in the Lupa field, north of Mbeya, but the production is not large. Tin is obtained from the Bukoba area, and mica is worked on a small scale in several districts. The output of diamonds, both gem and industrial, obtained from gravels in the Shinyanga district, is very important, and rich lead deposits at Mpanda have been developed with the assistance of a specially built branch line from the Central Railway. Coal is known in a number of areas south of the Central Railway, and development in the Songea area, where iron ore is also known, has been seriously considered. Substantial quantities of salt are produced by evaporation in the coastal margins.

Towns and Communications. Dar es Salaam, once a fishing village, has a central position, and is the best harbour on the coast. It is an Arab settlement with a modern European section, and has grown to have over 130,000 people of varying racial origins; it is the terminus of the Central Railway and the administrative centre of the Territory, it exports principally copra, cotton, ground-nuts, hides and skins, and lead. It has taken much *entrepôt* trade from Zanzibar, and formerly exported copper from the

Belgian Congo. The railway (metre gauge) runs through Morogoro, a leading centre of African cotton-growing, and Dodoma, a rail and road junction and capital of the Central Province, to Tabora (16,000 inhabitants), situated at the crossing of the old north-to-south and east-to-west caravan routes, and capital of the Western Province, and finally reaches Kigoma, on Lake Tanganyika. Kigoma, having a better harbour, has displaced the old Arab slave-centre of Ujiji. Tanga (38,000 inhabitants), exporting chiefly sisal and coffee, is the outlet of the important plantations of the north-east corner and capital of the province of the same name; its railway, the Usambara Railway, runs to Moshi and Arusha, the chief white centres, and has a strategic connexion with Voi on the Uganda line. Arusha is the capital of the Northern Province. Mohoro, near the Rufiji delta, is an outlet for mangrove poles, sugar, and cotton, nearly opposite is Mafia Island, rich in coconut-palms. Lindi, exporting coffee, sisal, cotton, and simsim, is likely to have its trade affected by Mtwara. The north-west of the territory has to export either *via* Lake Victoria and the Kenya and Uganda Railway, or by the line from Mwanza, on Lake Victoria, and capital of that Province, to Tabora and the coast; this line serves the diamond field. Bukoba collects the native-grown coffee of the district, and Mwanza deals chiefly in cotton, hides, and ground-nuts.

The Southern Province (capital Lindi) now has its railway from the deep-water harbour of Mtwara to Nachingwea, this, with much-needed roads, should promote the development of an important area and lead to the exploitation of known mineral deposits.

The Central Railway does a good deal of transit trade—both ways—for the eastern part of the Congo Basin; this has declined (see p. 271). Coffee from the Lake Kivu district goes out by this route.

The development of Kenya and that of Tanganyika Territory have followed similar lines, and the problems of the two areas are similar. The possibilities of white settlement are, however, more limited in Tanganyika, but for this reason, and because of its political status, there has been a greater stimulus to the improvement of the native farming in this area. Serious difficulties are connected with the spread of the infected tsetse fly in the

interior districts (rendering them unsuitable for occupation), locust invasions, and soil erosion.

Apart from processing raw products for export, there is no significant industrial development at present.

Trade. Textiles, mainly cotton piece goods, machinery, iron and steel goods, motor vehicles, petrol and oils, make up most of the imports. Sisal has usually the leading place among exports in value, with coffee, cotton, and diamonds as rivals for second place. Lead, oil-seeds, and vegetable oils, and hides and skins all make appreciable contributions to the exports, which include smaller items of the agricultural and mineral production. The United Kingdom has some 35 per cent of both the import and export trade; the second customer has usually been the U.S.A., followed by Western Germany, each taking much sisal.

ZANZIBAR

This alluvial and coralline island, 640 square miles in extent, lies a few degrees south of the equator, and is separated from the mainland by a channel 22 miles across at its narrowest part. With Pemba (380 square miles) it is a British protectorate, approaching independent status, under the nominal rule of a sultan. The total population is about 282,000, mainly Africans (Swahilis), but there are 45,000 Arabs, 16,000 Indians, and about 300 Europeans. The island of Zanzibar has well over half the population.

Productions. These fertile tropical islands, with a small annual range of temperature and a considerable rainfall, are intensively cultivated. Moreover, Zanzibar has been for several centuries the principal Arab trading-station on this coast and a great port for the whole of East Africa. Hence the explanation of its very mixed population. Its Arab and Indian population constitutes a big trading element. Many kinds of fruit, including oranges, are grown, but the important cultivations are cloves and coconuts, the former being much more valuable than the latter.

These islands produce the bulk of the world's supply of cloves. Large Arab- or Indian-owned plantations (*shambas*) produce most of the crop, but some comes from African smallholdings. The clove industry first became important about a century ago,

when the reigning sultan promoted it. A violent cyclone destroyed most of Zanzibar's plantations in 1872; they were largely re-established, but have, since 1940, suffered severely from a disease known as 'sudden death,' induced by a parasite. Pemba's *shambas* have been less affected, and the rehabilitation of those of Zanzibar may be attempted. The production of cloves and clove-oil has, however, been greatly reduced. Pemba to-day has about 40,000 acres under cloves as against 20,000 acres on Zanzibar before the disease appeared. Competition in clove production comes chiefly from Madagascar.

Locally grown coconuts from over 5 million palms have long been processed for the production of copra and coconut oil. This industry is supported by large imports of copra from the coastlands of Tanganyika and Kenya for bulking with the local product, which is of rather poorer quality. Oil-cake is made, and coir is used for matting and ropes, while soap-making has some importance. There is some cultivation of rice and tobacco. Small craft industries in ivory and ebony persist.

Zanzibar town (50,000 inhabitants) is opposite the mainland; it provides an extensive and sheltered anchorage. It was for long the largest city of East Africa, is visited by much shipping, and has a busy dhow traffic. Its importance as a trans-shipment centre has seriously declined with the development of mainland ports such as Mombasa and Dar es Salaam, but it maintains a considerable coastal traffic. It is an important cable station.

It was from Zanzibar that Swahili, the *lingua franca* of East Africa, spread. This basically Bantu language contains many Arabic words and smaller numbers of Persian, Hindustani, and Portuguese, and even English. It is understood along the coast from Durban to Aden, and is very widely understood in Tanganyika and over much of Kenya and Southern Uganda.

Trade. Though Zanzibar has lost much of its former importance as an *entrepôt* port, its staple productions give it a substantial trade. The remaining *entrepôt* trade largely consists in the collection of ivory from the mainland and in the distribution to it on a small scale of cotton piece goods and petroleum.

Imports are mainly rice, sugar, flour, ghee, tobacco, and sacks. Exports are chiefly cloves (by far the most important), clove-oil,

copra, coconut-oil and -cake, and soap. The United Kingdom sends about a quarter of the imports and takes a somewhat smaller share of the exports. India, Kenya, and Tanganyika are important both as suppliers and customers.

CHAPTER IX

ISLANDS OF THE INDIAN OCEAN

MADAGASCAR

THIS is one of the large islands of the world, and lies between 12° S. and 25° S latitude. It is 980 miles long, with a maximum width of 360 miles, and has an area of nearly a quarter of a million square miles. The population is about 5,000,000, of whom 75,000 are Europeans (including 50,000 French), while there are some 20,000 Arabs, Indians, and Chinese. The Malagasy are largely of Malayo-Indonesian stock, but there has been intermarriage with Negro peoples, and in the west and south are tribes of almost unmixed African origin. The dominant tribe is the Hova, numbering a million, and their Malayan language (Malagasy) is in general use in the island, this Malayan people and the Betsileo, of mixed blood, are two vigorous types, and occupy the greater part of the plateau. There are a considerable number of French colonists, as well as creole¹ immigrants from Réunion and Mauritius. The Asiatics are chiefly traders and shopkeepers.

The interest of the French in the island began with the rise of the East Indian trade, when Madagascar was used as a calling-station, they thus avoided African ports used by the traders of other countries. Actual conquest commenced in the north-west, where territory was claimed as having been ceded by local chiefs. Fighting with the Hovas took place between 1882 and 1885, after which the French assumed control over the foreign relations of the island which became a colony in 1896. It is now the Malagasy Republic, independent within the French Community. It is physically related to the mainland—separated from it by the Mozambique Channel, with a minimum width of 240 miles—but has few economic connexions with it, and, in addition, has many characteristics that sharply distinguish it, particularly in regard to

¹ A creole is a person of European descent born in the tropics, notably the East and West Indies, in this area they are mostly of French origin.

the origin of the population, the flora, and the fauna. Nevertheless, it offers a study in tropical development with distinct similarities to certain other divisions of the continent

Physical Conditions. A coastal plain—fairly broad in the west and either non-existent or very narrow in the east—rises sharply, especially in the east, to a central dissected plateau with a general altitude of between 3000 and 4000 feet, but with outstanding ridges and massifs that lie relatively near the east coast and form the north-to-south watershed of the island. The highest part is towards the north, the volcanic Tsaratanana massif reaching 9450 feet. More extensive, though less high, is the massif of Ankaratra, a volcanic area reaching 8575 feet, situated south of Tananarive. On the eastern side gorges have been cut by torrential rivers, the chief of which is the Mangoro, on the west the rivers have less steep gradients, and pass through gently sloping plains, although there are evidences of a broken ridge lower than and parallel to the main plateau. The Betsiboka, Mangoky, and Onilahy are among the more important of the streams draining to the Mozambique Channel, they have some value for navigation, especially in the summer. The plateau falls fairly gently to a coast plain in the south

Geologically Madagascar is an outlying portion of the South African plateau. The central highland and its eastern flank consist of Archæan rocks, gneiss, granite, and schists. To the east are rocks of Cretaceous age, with a band of recent deposits extending from Fort Dauphin to Tamatave. There are recent deposits, too, round Lake Alaotra, which has an area of 80 square miles. The western plains are of sedimentary rock, becoming younger from Permian to Tertiary between the highlands and the sea. Archæan rocks cover, however, two-thirds of the area, and most of the exposed igneous rock has been decomposed into laterite, giving a characteristic red colour to much of the surface. Old cones and lava-flows are widespread, but, although earthquake shocks are felt from time to time, the only remaining evidence of active vulcanism is the frequent occurrence of hot springs

The east coast is remarkably straight for a great part of its length, there is a long string of lagoons here, now connected by

the Canaux des Pangalanes, which run for several hundred miles south from Tamatave. Natural harbours are few along this coast, but in the north Diego Suarez can accommodate large vessels, while the west coast has a number of good estuaries, including the

bays of Ampasindova and Bombetoki, as well as a good harbour at Tuléar. Coral reefs fringe the coast

Climate and Vegetation Most of Madagascar lies north of the Tropic of Capricorn, and the island is consequently under the general influence of the south-east trades. Broadly speaking, mean sea-level temperatures decrease from north to south. The highest mean monthly temperatures range from a little above 80° F. in the north to a little below that figure in the south, while for the coolest month the figures are from 73° F. in the north to 68° F. in the south. But there are considerable differences in the daily range of temperature, which varies with the character of the rainfall and with the elevation. Thus high daily ranges are common on the west and south-west, where the climate tends to aridity, and on the plateau in the dry season minimum temperatures approximate to freezing-

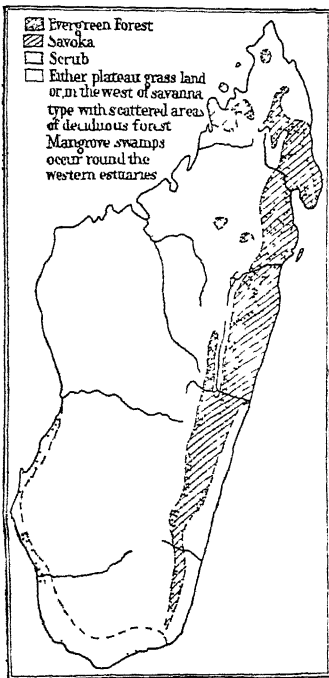


FIG. 131. MADAGASCAR—
VEGETATION

*Adapted from a map described in "The
Geographical Teacher," Spring, 1923*

point. The effect of elevation on mean temperatures is shown by Tananarive (Antananarivo) at 4500 feet, ranging from 58° F. to 70° F., as compared with Tamatave (72° F. to 80° F.).

The rainfall is naturally heaviest on the eastern seaboard and plateau slopes, and comes mainly in the southern summer. At

this season the plateau has plentiful precipitation; the western plains, however, receive only a small amount of this largely convectional rainfall, except towards the north, where the lowlands for a considerable distance north and south of Mayunga have a large amount. The south and south-west coasts receive only a moderate to scanty share of the summer rainfall, and here summer temperatures are very high. In the southern winter only the east coast and eastern slopes have any substantial precipitation, and this is considerably less than the amount which falls in summer.

Destructive tropical cyclones chiefly affect the east coast, and are most numerous in the summer months.

There are five climatic zones.

(1) *The Northern Tip* Hot and wet from November to April; less hot and much less wet for the rest of the year.

(2) *The Eastern Zone* Hot and wet, rain all through the year, heaviest in summer. Tamatave has 123"; the months of least rainfall, October (3 8") and November (5"), precede the heavy rains. March has over 17".

(3) *The Western Plains* Hot and wet in summer, with rainfall decreasing southward, dry in winter.

(4) *The South and South-west Coasts* Relatively dry and hot, the small rainfall—in places as low as 16"—coming in the summer; the winter is dry and very warm.

(5) *The Plateau* Warm-temperate in character, with summer rain. Tananarive has a mean annual temperature of 66° F., an annual range of 12° F., and 54" of rain, of which only 2¼" falls between May and September inclusive. Large daily ranges occur during the dry season.

The *natural vegetation* closely follows the climatic zones. The eastern wet zone has dense forests containing ebony, rosewood, rubber, copal, the raffia-palm, and numerous species characteristic of hot, wet forest. A more temperate type of forest, with much bamboo, ascends the eastern slopes of the highland. The western plains, with their dry season, have deciduous forests. Round the estuaries of the west coast mangrove swamps afford a useful source of tannin. The south and south-western coasts have semi-desert vegetation. The plateau, which has most of the population, is mainly grass-land, the tree-growth being limited by wind.

As in so many parts of tropical Africa, the forest has been seriously interfered with by native methods of cultivation, so that to-day it covers only 14 per cent of the area of Madagascar. Prolonged shifting cultivation has degraded the vegetation to that of a brushwood type. The forest thus descends to 'savoka,' and as 'savoka' is often afire, it sinks into bush. The laterite which is so often exposed in this way hardens under the influence of the sun to a crust that is useless to vegetation, and much gets washed away by heavy convectional rain. The authorities are grappling with this serious problem.

The long separation of the island from the African mainland is illustrated by the fact that three-fourths of its species of plants are not represented there. The fauna illustrates this feature even more remarkably. The anthropoid apes and monkeys and the larger ungulates and carnivores of the mainland are absent, and rare forms of animal life, including lemurs and chameleons, are common, while the recent deposits contain remarkable fossils of relatively old forms, including giant birds and saurians. The reptiles resemble those of South America rather than those of Africa.

Productions Before Madagascar became a French possession the external trade was very scanty. It is not, in comparison with the size of the island, very great yet. Attention has been given to forest-products and forest-conservation, to the development of tropical agriculture (which has been greatly assisted by immigration from the Mascarene Islands), and to active agricultural research and encouragement, although the importance of pastoral occupations has not been neglected. The labour-supply is a difficulty, the island is relatively thinly peopled, and traditional methods of agriculture are primitive and wasteful, besides which the Malagasy are not easily diverted from their customary food-production to plantation-work. The system of land-tenure has been altered to promote plantation development.

Wild products have relatively little importance. Mangrove-bark is obtained in the west; ebony and rosewood are found in the eastern forests up to an altitude of about 500 feet, and other useful timbers occur; the raffia-palm is widespread, though it is now cultivated, beeswax, honey, and gum copal are collected,

but rubber-tapping has all but ceased. There is now a substantial export of raffia, and this product has considerable importance for local purposes.

The food-crops cultivated have in some cases become so important as to provide a surplus for export. Rice is by far the leading cereal, covering over $1\frac{1}{4}$ million acres, some 40 per cent of the cultivated area, and is widely grown in deltas and places which can



FIG 132. BETSILEO RICE-TERRACES

*Service General d'Information du Haut-Commissariat de la République
Française à Madagascar et Dependances*

be irrigated; its production has recently expanded in the hinterlands of Nossi Bé and Bombetoki, it is noteworthy that the two principal interior centres, Tananarive and Fianarantsoa, are both situated on irrigated upland plains. There is now a substantial surplus of rice, while large plantations of cassava, which occupies the second largest acreage, in the east and north-west permit an export of tapioca. A beginning has been made with the export of ground-nuts, for which cultivation the light soils of the west are admirably suited. One of the most widespread products is maize,

the cultivation of which by the west coast has greatly expanded, another is Cape beans, of which there is a large crop in the western parts; haricots are widely grown on the plateau, and are exported with potatoes to Réunion and Mauritius. Cotton, tobacco, and sugar are all grown for local use. Market-gardening is carried on round the principal centres of the plateau, the chief European fruits and vegetables having been introduced



FIG 133. A CATTLE-FAIR ON THE MADAGASCAN PLATEAU
*Service General d'Information du Haut-Commissariat de la Republique
 Française a Madagascar et Dependances*

Tropical agriculture, usually on European or creole plantations, is steadily proceeding, mainly along the eastern margins and in the north-west. Coffee of the *robusta* type, notably in the Fianarantsoa and Fénéry districts, is economically the most significant; clove cultivation on St Mary Island and the adjacent mainland in the hinterlands of Fénéry and Brickaville is well established, and vanilla, introduced from Réunion, has become important. Tobacco and sugar production have increased, the former especially in the Ambositra area, while sugar is cultivated on European plantations in the Majunga-Nossi-Bé zone and by Malagasy and Europeans in the Tamatave area. Considerable attention has been given to the growing of plants giving essences for perfumes, such as ylang-ylang and lemon-grass. Tea and

cocoa have not met with much success, but deltaic areas of the north-west now carry coconut plantations, and there is a small export of copra. The castor-oil plant is grown in some of the drier parts, and developments in irrigation cotton are looked for in the south-west, where sisal is cultivated in the Tuléar district. Mulberry-trees are grown in connexion with sericulture.

On the plateau stock-rearing is a staple occupation. The native cattle are of the zebu or humped type, and the native sheep are fat-tailed—that is, both are adapted to the dry season. Cattle are by far the more important, and there are more than 6,000,000 head; they are, however, of a poor type, and little progress has been made in improving the herds. The great problem is the shortage of food in the dry season, when many die of exposure on the plateau. Nevertheless, several of the larger towns—the capital, Tamatave, Diego Suarez, Antsirabe, and Majunga carry on meat-packing, and there is an export of animals to Réunion and Mauritius and a much more valuable export of hides. Sheep number about 400,000; successful attempts have been made to improve the breed, and flocks have recently increased. Goats and pigs are kept in similar numbers, and a beginning has been made in the production of bacon and lard. Small numbers of asses, mules, and horses are also reared.

Minerals. The island's mineral wealth is sufficiently well known and exploited to have some importance. The Archæan rock

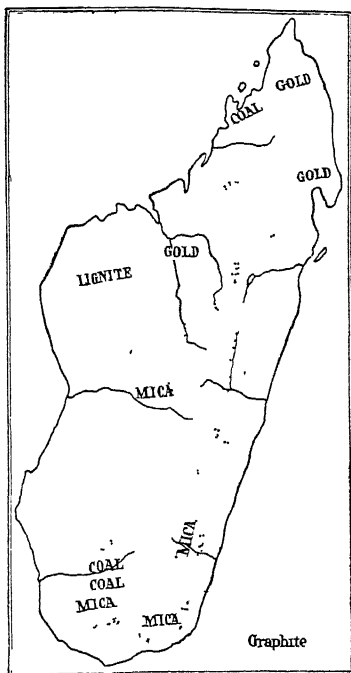



FIG. 134. MADAGASCAR—
MINERALS

contains a large variety of minerals. Alluvial gold occurs in the north, but the output is small. Iron, copper, nickel, and lead ores are known to exist. Bauxite and graphite are widespread in the lateritized areas, graphite has considerable importance, but the output has fluctuated remarkably, largely owing to labour difficulties. Since production began in 1909, the annual output has fluctuated between 4000 and 35,000 tons; now at about 15,000 tons, it rivals that of Ceylon. The Brickaville district is the most productive area for this mineral. The mica output has



FIG. 135. AN UNIMPROVED SECTION OF THE PANGALANES CANAL 

*Service General d'Information du Haut-Commissariat de la Republique
Francaise a Madagascar et Dependances*

also fluctuated; recently it has been small. Considerable future importance is attached to the deposits of coal in the upper Onilahy valley.

Communications and Towns. Many crafts are practised, such as the weaving of cotton, silk, hemp, raffia, and other fibres, but there is little industrial activity in Madagascar. A good deal of labour is employed in connexion with the preparation of primary products—e.g., sugar and tapioca—and in mining, in regard to the development of which there is available plentiful water-power. The meat-packing industry has already been referred to (p. 317). Labour is seriously short for the developments that are hoped for. Porterage is still largely necessary, though declining with the

development of motor services. There are now some 2500 miles of good roads, principally connecting more important towns, and another 14,000 miles of roads suitable for dry-season motor traffic. Certain rivers, particularly in the west, have considerable local value. The Canaux des Pangalanes, connecting the east coast lagoons, between Cape Foulwind and Farafangana, provides a waterway 400 miles long, of local importance for coastal traffic. It cannot properly serve the developing eastern valleys without being widened, deepened, and cleared of weedy growth.



FIG 136 OPENING THE ENTRANCE TO AN IMPROVED SECTION OF THE
PANGALANES CANAL, SOUTH OF TAMATAVE

*Service Général d'Information du Haut-Commissariat de la République
Française à Madagascar et Dependances*

Many miles in the northern section have been so improved. Railway communications are very limited.

The principal railway starts from Tamatave (35,000 inhabitants, including 7500 Europeans), the leading port, with a harbour somewhat protected by banks of coral. It deals with much shipping and has oil-storage tanks and an important airport. The railway passes along the coast to Brickaville, and then climbs to the first step of the plateau at Moramanga (3000 feet), a centre for forestry, manioc, and graphite, and the junction for a branch to Ambatondrazaka, south of Lake Alaotra, a rice-growing area.

From Moramanga the line goes on to the capital, Tananarive, formerly a large collection of villages and the Hova capital, but now largely with substantial modern sections and a population

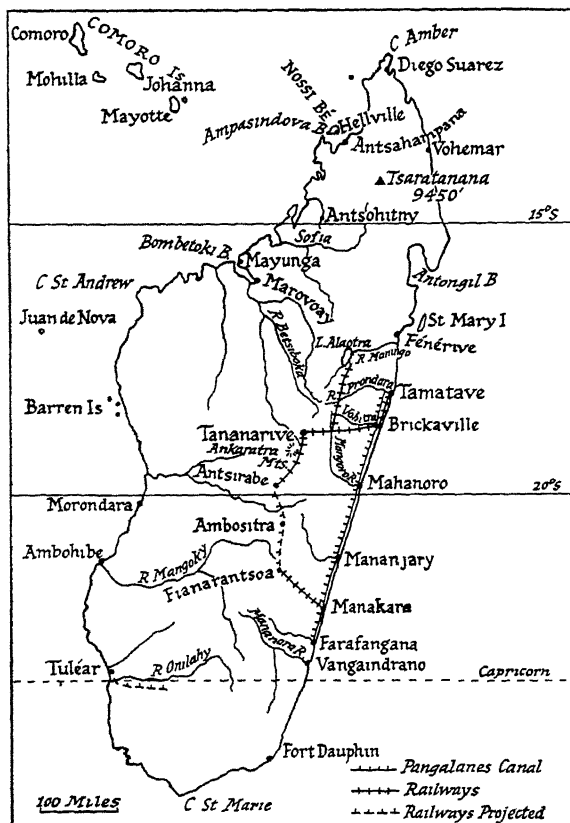


FIG. 137. MADAGASCAR—TOWNS AND COMMUNICATIONS

totalling 180,000, 10 per cent. of whom are Europeans. It is on the edge of a fertile, well-watered plain surrounded by hills. Its general position is central for the well-populated plateau-heart of

the country. Several regular air services from Paris use the airport of Tananarive. From here a line runs southward to the important centre of Antsirabe (population 20,000), and may be continued through Ambositra to Fianarantsoa (population, 17,000), the centre of the Betsileo people. A railway has been completed between the latter place and Manakara, which exports the coffee brought down by the railway; like Mananjary (14,000 inhabitants), some distance to the north, it serves both coastal and plateau districts. The second port in importance is Mayunga (34,000 inhabitants), in an area of active tropical development. Diegn Suarez (27,000 inhabitants), in the extreme north, and Vohémar can both accommodate large vessels; the former is a naval station, arsenal, and port of call. A railway is projected inland from Tuléar; this would serve the Onilahy valley, very fertile and capable of irrigation, already producing rice, cotton, and sisal, as well as having a promising coalfield. The harbour is well protected by a coral reef, and may become the most important in the island. Fort Dauphin serves the chief mica district.

Trade. In relation to her size and population the oversea trade of Madagascar is not large. At the same time, recent years have shown some expansion, probably related to the increase in the number of Europeans (now more than twice the 1938 figure) and to more active development. Of the imports cotton piece goods are important, but are now often exceeded in value by machinery, petroleum products, metal goods, and motor-vehicles; other imports of note include clothing, jute bags, and certain foodstuffs. Of the exports, coffee is by far the most important; tinned meat, vanilla, cloves, hides, and graphite are significant, and small quantities of mica, rice, tapioca, sisal, raffia, and sugar make up most of the rest.

Nearly the whole of the trade is with France.

MAYOTTE AND THE COMORO ISLANDS

This archipelago, lying in the Mozambique Channel, formerly a dependency of Madagascar, consists chiefly of four islands, with a total area of 800 square miles and a total population of 180,000, mainly Mohammedans of mixed origin like the inhabitants of Zanzibar, and including about 1000 whites. The principal

island is Grand Comoro. The group, hilly and of volcanic origin, has a tropical wet climate, and is washed by the warm Mozambique Current. The natural forest has been largely cleared for tropical plantation. Sugar, formerly the leading crop, has considerably declined; rum is distilled from molasses. Vanilla has assumed more importance than sugar, while ylang-ylang, patchouli, sisal, cocoa, and coconuts are cultivated, and cattle are reared on the higher parts. These are the chief products, and, with hard timber from Grand Comoro, provide the exports, the trade returns have hitherto been included in those of Madagascar. With the decline of sugar cultivation there has been considerable emigration to that island and the adjacent coast of South Africa. The capital is Dzaoudzi, on Mayotte.

The island of **Juan de Nova**, in the middle of the Mozambique Channel, produces small quantities of phosphates

THE MASCARENE ISLANDS

Though doubtless known earlier to the Arabs, this group, then uninhabited and covered with forest, was discovered in 1507 by the Portuguese, from one of whom the name is derived. The islands are of volcanic origin, and cap a submarine ridge lying from 400 to 500 miles east of Madagascar, in about 20° S. latitude. The climate is hot, though not excessively so, with a small range of temperature and with a good rainfall, chiefly in summer, from the south-east trades. Destructive hurricanes are common, and occur mostly in the wet season. Réunion has a greater elevation than Mauritius. The group includes the isolated island of Rodriguez, lying to the east. The natural vegetation is forest, but this has largely disappeared. The indigenous flora and fauna show even less resemblance to those of Africa than do those of Madagascar. Emigration from these islands to Madagascar has been of great importance in connexion with the development of the latter.

Réunion

Originally called Bourbon, this island has been French since 1664. It covers barely 1000 square miles, and has a population

of 305,000 chiefly *créoles bournonnais*.¹ There are a few hundred British Indians, and some Chinese, Negroes, and Malagasy. The island has a surf-bound coast, and is entirely volcanic; it is of much greater elevation than Mauritius, and a maximum height of over 10,000 feet is reached in the Piton des Neiges, in the north-west. Active vulcanism continues in the south-east, where there was a serious outbreak in 1927 in the neighbourhood of the

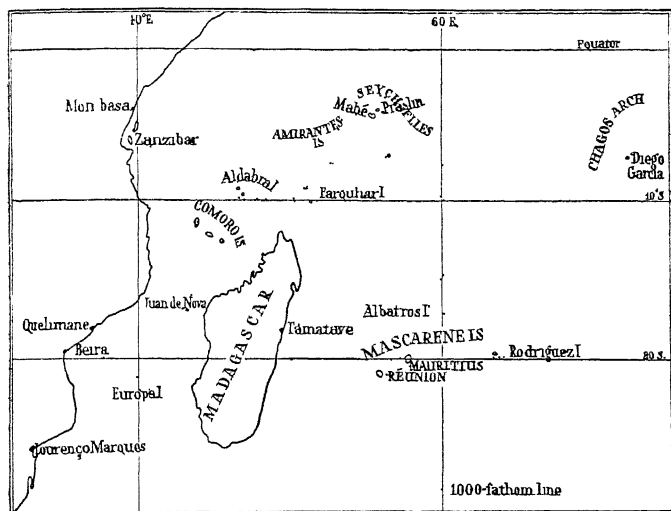


FIG. 138. ISLANDS OF THE INDIAN OCEAN

Piton de la Fournaise (8200 feet). As in Mauritius, the mean annual temperature is about 74° F.; the rainfall, coming chiefly in summer, is very heavy on the higher parts. The lower areas are often unhealthy and swampy. There are still 150,000 acres of forest. In the early colonial days the island was chiefly important for its coffee plantations, but the last century saw the substitution of sugar as the staple crop. Sugar covers some 60,000 acres, a quarter of the total cultivated area. The sugar crop is much smaller than that of Mauritius, there being little Asiatic labour in

¹ Descendants of early French settlers

the island; the production, though fluctuating, is considerable; much rum is distilled. Vanilla is now an important cultivation, and there are considerable areas under tobacco and coffee. Cloves and perfumes are also produced. Food crops include maize, rice, and manioc, while temperate crops can be grown at the higher elevations.

The chief port is Pointe des Galets, near the town of St Paul (25,000 inhabitants), on the north-west coast; it has a good sheltered harbour, the only one suitable for large vessels. The towns are necessarily scattered in the relatively small areas of lowland round the coast. The capital is St Denis, in the north, with 40,000 inhabitants; St Benoît is in the north-east and St Pierre (24,000 inhabitants) in the south-west. These towns are connected by 80 miles of railway. There is cable connexion with Tamatave and Mauritius.

The imports consist chiefly of rice and foodstuffs from India and Madagascar and cotton and metal goods from France. The exports principally consist of sugar, rum, essential oils (for perfumes), and vanilla.

Mauritius

This island, originally called Cerne by the Portuguese, was occupied in 1598 by the Dutch, who gave it its present name. Owing to the failure of their settlement, the Dutch deserted it in 1710, leaving many marooned slaves. In 1715 the French occupied it under the name of Ile de France. During the Napoleonic Wars it became a base for privateers, but surrendered to the British in 1810. It has an area of 720 square miles and a population of rather more than 580,000. About two-thirds of the population consists of Indians, largely immigrants for plantation work; most of the remainder are creoles and Negroes, and there are some 20,000 Chinese. The Indo-Mauritians, as the Indian section of the population is termed, are increasing at the rate of 12,000 a year; the Sino-Mauritians show a proportionate increase. The density of population averages 760 to the square mile; nearly 40 per cent. of the people live in the towns. The island is largely fringed with coral reefs; most of the interior is highland, the maximum elevation being the Piton de la Rivière Noire (2711

feet), in the south-west. The heavy rainfall on the highlands, coming chiefly in summer, and reaching nearly 200" on the highest parts, has a rapid run-off, owing to the clearing of forests (which once contained a good deal of ebony), so that the lowlands are swampy. Malaria has been a serious problem, and steps have

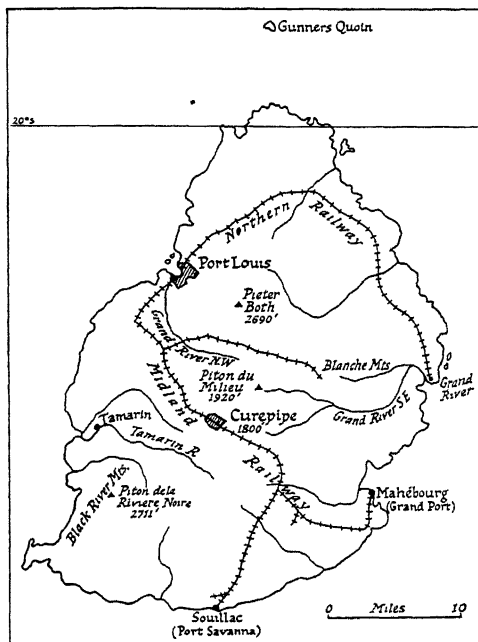


FIG 139. MAURITIUS

been taken to combat soil erosion. There are considerable modifications of both temperature and rainfall due to relief; the rainfall notably varies from place to place and from year to year. It averages 50" in the lowlands, with only 30" in the coastal areas of the north and west.

There is a remarkable development of the sugar industry, which was established here nearly two centuries ago with the assistance

of Negro labour; so dominant is this crop that it normally provides about 90 per cent of the export values, the production varies from year to year, being somewhat dependent upon the weather and upon the depredations of a beetle pest. The sugar plantations are very largely in Indian hands, and mechanization of field-work is widespread; some sugar is grown on Indo-Mauritian peasant lands. Factories attached to the large plantations process two-thirds of the cane. The cultivation of tobacco, vanilla, bananas, ground-nuts, pineapples, tea, and food-crops such as rice and maize is as yet very limited, but more attention is now being directed to crops other than sugar, as food and other necessities must be mainly imported. Particularly good progress has been made in tea production. Mauritius hemp, derived from an aloe, grows wild, but it suffers from the competition of Manila hemp and sisal, and the production is small. Irrigation has received attention, since the lowlands have a relatively small rainfall and a definite dry season. An irrigation scheme in the Black River district of the south-west subserves sugar growing, another scheme serves the north of the island. Cattle are reared largely for draught purposes, and there is a small export of hides, goats are more numerous, and there are small numbers of sheep and pigs.

There are three small hydro-electric stations on the Tamarin river. Much processing of raw products goes on—sugar, tea, aloes, and tobacco—while alcohol is distilled from molasses. A number of factories—furniture, clothing, etc.—serve local needs. The local currency is the rupee.

Mauritius has two good harbours, Port Louis and Grand Port. The latter, with the town of Mahébourg, is little used, being exposed to the prevailing wind. Port Louis, with 70,000 inhabitants, is on the north-west and sheltered side of the island, and is protected on the land side by highlands. Here is concentrated most of the trade, but as the town is low-lying, Europeans have deserted it as a place of residence for the uplands round Curepipe (22,000 inhabitants), in the interior, at 1800 feet. Souillac (Port Savanna) is a picturesque seaside resort. The island has now about 82 miles of railway, some sections having been closed with the development of motor-transport; the closing of the remaining lines is being seriously considered. Mauritius is a cable-station

and a place of call for some vessels using the Cape route to India. The island's airport is at Plaisance, in the south-east

The imports include large quantities of foodstuffs, especially rice from Burma and Madagascar. Wheat from Australia and edible oils and fats are other important food imports. Some coal comes from India and the Union of South Africa, and petroleum from the Persian Gulf, textiles, motor-vehicles, machinery, and other manufactured goods, including fertilizer (especially ammonium sulphate), come largely from the United Kingdom. The United Kingdom takes large quantities of sugar, which also goes to Ceylon, Hong Kong, and British East Africa.

Rodriguez is a dependency of Mauritius, 350 miles to the east, it is a volcanic island rising to 1700 feet, with an area of 42 square miles and 16,000 inhabitants, chiefly Negroes. It is nearly surrounded by coral reefs. With a climate similar to that of Mauritius, though somewhat cooler, it grows citrus fruits, maize, and beans, and rears cattle and goats, while fishing has considerable importance. The population has increased considerably, and contour-planting has been introduced because of soil erosion.

The **Chagos Archipelago** is part of a group of islands known collectively as the Oil Islands. These also are dependencies of Mauritius, and are disconnected groups of atoll formation, lying but a short distance south of the equator in the middle of the Indian Ocean. The total population is barely 2000, and consists mainly of Negroes and Malagasy. Coconuts provide a considerable export of oil and copra, guano and salted fish, which mostly go to Mauritius, are also produced. The Chagos Archipelago contains the remarkable atoll of Diego Garcia, which encloses a lagoon 13 miles long from north to south and 4 to 6 miles wide. This is a useful fuelling station on the routes from the Red Sea to Western Australia and between Mauritius and Colombo. The lesser dependencies are of no particular importance; they include Trois Frères, St Brandon, and Six Islands.

THE SEYCHELLES

This British group, with dependencies, contains 92 islands, having an area of 156 square miles. The most important island

is Mahé (56 square miles), the next largest being Praslin (20 square miles). The population numbers 42,000, and is mainly African in origin, but contains a large number of creoles and some Indians. The dependencies include the Amirantes, Aldabra, Providence, and Farquhar Islands.

The Seychelles are of granitic and volcanic formation, in some parts of considerable elevation, rising in Mahé in the Morne Seychellois to 3000 feet; they are surrounded by coral reefs. Being only a few degrees away from the equator, they have a climate which is remarkably equable, without excessive heat, and without the disastrous hurricanes that do so much damage nearer the Tropic of Capricorn. There is plentiful rain, due to the north-west wind that blows from December to April. The south-east trades blow for the rest of the year. The forests include a certain amount of mangrove swamp. There are few domestic animals, but fishing, principally for tortoiseshell and trepang, has some importance. Communications are largely coastwise, but motor transport on the larger islands is increasing; Mahé has a motor road round most of its circumference, and two such roads across it. Soil erosion has developed on this island, and the Morne Seychellois has been reafforested as a remedial measure.

Cultivation is mostly on peasant holdings of under 5 acres. Apart from foodstuffs grown for local consumption—sugar, maize, manioc, bananas, and yams—cultivation is mainly concerned with coconuts and spices. On Praslin and Curieuse the *coco-de-mer*, or double coconut, is indigenous; it is found nowhere else in the world. There are some 28,000 acres under coconuts, the next important product being cinnamon. Vanilla, on the coastal soils of Praslin, cloves, patchouli, and pineapples are also cultivated. Small numbers of cattle and pigs are scattered through the coconut plantations, and poultry are reared. The industries are chiefly connected with the drying of copra, the extraction of oils, the working of guano on the outlying coral islands, and the collection of mangrove-bark.

Port Victoria, on the north-east of Mahé, is the capital; it has a good harbour, is a fuelling-station, and is called at regularly by vessels running between Bombay and Mombasa. It has cable connexions with Mauritius, Zanzibar, Aden, and Colombo.

Imports are made up principally of cotton goods, rice, and other foodstuffs, including maize, flour, and sugar. The foodstuffs come largely from Kenya. Copra usually provides two-thirds of the export values, and cinnamon-oil and -bark half the remainder. Exports go chiefly to Kenya, India, and the United Kingdom

CHAPTER X

SOUTHERN AFRICA

GENERAL CONSIDERATIONS

THE large economic region of Southern Africa comprises a number of political divisions, with a total area of about 2,000,000 square miles and a total population of fully 30 millions, including about $3\frac{1}{2}$ million whites. Although stretching through many degrees of latitude (from roughly 10° S to 35° S), and therefore exhibiting diversities of climate, it has considerable uniformity of relief, as well as a large measure of economic and political unity. Except for Portuguese East Africa, the whole area is comprised within the British Commonwealth. The dominant political unit is the Union of South Africa, which has, for Africa, a well-developed railway-system, linked with that of South-West Africa (a Union 'mandate'), and through Bechuanaland with the railways of Rhodesia. The federation of Northern and Southern Rhodesia with Nyasaland took place in 1953, largely on economic grounds. The railway links of these northern territories are being improved, and the reason for placing Portuguese East Africa in this large economic division is the dependence of Nyasaland, Southern Rhodesia, and the Transvaal upon rail-communications with the Portuguese ports of Beira and Lourenço Marques. It should be further noted that in no other division of Africa has the exploitation of mineral wealth been of such outstanding importance or played such a dominant part in the historical and economic development. The whole region keeps official time two hours in advance of Greenwich, based upon longitude 30° E.

Physical Conditions Apart from a rather considerable area of lowland in Portuguese East Africa, along the coast of which is a belt of recent alluvial deposits, South Africa shows the ancient plateau structure (with a higher bordering rim) so typical of the continent. The interior basin of Lake Ngami and the Makarikari

Salt-pans and the Molopo basin are filled with recent alluvial and lacustrine deposits, bordered by Primary or ancient crystalline rocks. Important beds of Primary sandstone—for example, the Table Mountain Sandstone—and ancient conglomerates occur, especially in South-West Africa and in the Transvaal. In the central and eastern parts of the Cape Province and in the Orange Free State and Natal are sediments laid down between late



FIG 140 GRANITE KOPPIE, SOUTHERN RHODESIA

These koppies result from the erosion of igneous intrusions, and should be distinguished from the flat-topped koppies produced in sedimentary formations and common farther south in South Africa. Good tobacco soils are often found in their neighbourhood.

Information Department of the Federation of Rhodesia and Nyasaland

Carboniferous and early Jurassic times, and include valuable coal measures. A great deal of faulting and some folding has taken place in the south and south-east, and the whole area has been subjected to prolonged denudation. In the interior, where relatively dry conditions prevail, the horizontal bedding of many of the rocks has led to the development of the flat-topped conical hills, often bordered at the top by precipitous cliffs, known as koppies; these are frequently very conspicuous features of the

landscape In some parts, especially Rhodesia, koppies of irregular outline arise from erosion along joint planes in igneous rocks

The average elevation of the plateau considerably exceeds 3000 feet, the principal areas not reaching this height being the Molopo basin, considerable regions round the Limpopo and Upper Zambezi, the Ngami depression, and the deep, unhealthy trench of the Luangwa. In addition, the rift valleys, occupied by Lake Tanganyika, Lake Nyasa, and the Shire, are below this elevation. The western rim, which at places in South-West Africa exceeds 6000 feet, is broken by the Kunene and the Orange. The eastern rim contains the most prominent relief in Southern Africa—the long water-parting from the Stormberg in the east of the Cape Province to the Soutpansberg just south of the Middle Limpopo. In the Drakensberg, broad, flat-topped, and deeply dissected highlands, the highest points of Mont aux Sources and Cathkin Peak exceed 10,000 feet. Between the Limpopo and Zambezi lie the Matopo Hills and the highlands of Mashonaland, which on the eastern border of Southern Rhodesia exceed 6000 feet, but this elevation is reached, to the north of the Zambezi, only in the highlands bordering the Rift Valley. In the extreme south erosion of the folded rocks and structural differences have led to a terrace formation, with the feature-lines running east to west, the Little Karoo lying between the Langeberg and the Swartberg and the Great Karoo between the latter and the Nieuwveld Range. In the extreme south-west, however, the trend of the Olifants Mountains is from N.N.W. to S.S.E.

The principal river is the Zambezi, which, having captured a good deal of the drainage formerly running to the Ngami depression, now derives many head-streams from the Bihé plateau. As a navigable waterway it is seriously impeded by the Victoria Falls, and by rapids and the Kebrabasa Falls lower downstream, while its lower course and delta are subject to serious floods and may be rendered difficult by a prolonged period of low water. It receives the Luangwa and the Shire; the latter drains Lake Nyasa, a useful water area, with its surface at 1650 feet. The Limpopo, like its tributary the Olifants, drains a considerable area on the inside of the eastern rim, but it is of little value for navigation, as its régime, like that of other South African rivers,

involves little water in the winter season. South of this are many rivers which, assisted by a relatively high rainfall, are eating into the highland, such are the Tugela, Umzimkulu, Great Kei, and Great Fish rivers, while in the south are a number of rivers, including the Gamtoos and Gouritz, with well-developed longitudinal sections. The Orange, the upper basin of which is important for water supply and irrigation, receives no permanent tributary below the junction of the Vaal; the Caledon is one of its more important upper tributaries. The Orange rises in the Drakensberg, and has many rapids along its course; it makes a final plunge of 400 feet below Upington, and loses much water by evaporation in its lower course.

With a plateau structure, and presenting a generally steep edge to the sea, it is not surprising that Southern Africa has few good harbours. Most are only open roadsteads until artificially improved. Walvis and Saldanha Bays are good, but Table Bay has a bad reputation, as it is exposed to strong winds. Elsewhere the finest natural harbour is probably Durban, and the island of Mozambique provides shelter along the swampy, reef-fringed coast of Portuguese East Africa. Numerous lagoons and creeks provide local navigation for small craft in the neighbourhood of Quelimane and Inhambane.

Lake Nyasa is the most important lake of the area; it occupies the south-east of the Rift Valley, and its deepest part is nearly 700 feet below sea-level. Its water-level seems to be subject to periodic

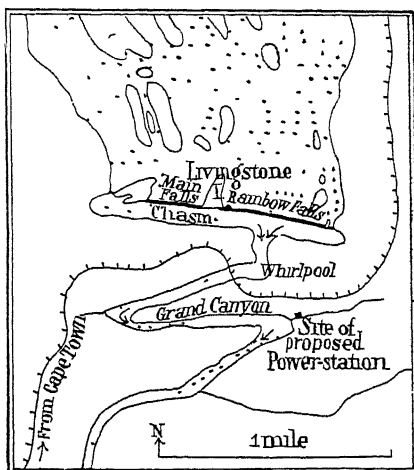


FIG. 141. THE VICTORIA FALLS

The gorge continues for forty miles, its course having been determined by well-marked joints in the Tertiary basalt. The Falls are 357 feet in height

fluctuations, and steps to control it by means of a dam on the Shiré have been proposed. Lake Bangweulu is barely 20 feet in depth, and is surrounded by extensive swamps. Lake Ngami is, owing to interior desiccation and the capture of its water by the Zambezi, now only a swamp; water struggles into it from the Okovango Marshes, and the Botletle, which may be quite a considerable stream in a wet season, carries water to the Makarikari Salt-pans. Numerous salt-pans and 'vleis' dot the region between here and the Cape.

Climate. Broadly speaking, the climatic conditions vary from tropical in the north to warm temperate in the south, but as mean temperatures, except at the highest elevations, are nowhere low, the amount and distribution of the rainfall are of greater importance than the temperature conditions in determining the type of vegetation. The general factors affecting the climate are as follows:

(1) The west coast has much lower temperatures than the east, as it is affected by the cool Benguela Current, while the east feels the influence of the warm Mozambique Current, which, continuing as the Agulhas Current, sweeps along the south coast. Swakopmund's highest and lowest mean monthly temperatures are 63° F. and 55° F., contrasting with Durban's 76° F. and 63° F. The cooling influence of the Benguela Current, however, is confined to the coast, and Windhoek, although at 5463 feet, has corresponding temperatures of 75° F. and 55° F. These currents, moreover, contribute to the comparative wetness of the east coast and the extreme aridity of the west, where the cool water leads to frequent fogs, so that Walvis Bay, with less than a half inch of rainfall, has a mean annual relative humidity of 84 per cent.

(2) The eastern margins are subject to moist air streams especially in summer. The high eastern barrier tends to concentrate the rainfall on the coast belt; otherwise the general result is a gradually decreasing rainfall westward. Durban has 45", Bloemfontein 21", Upington 7", and Luderitz Bay less than 1". This general effect is modified in several ways, towards the north the influence of the inter-tropical front causes heavier rainfall, especially where the relief is high, the highlands round Lake Nyasa receiving up to 100"; the eastern parts of both Northern and Southern Rhodesia

have over 30", and even the north-east of South-West Africa has over 20". Again, in the Cape Town area, and for a considerable distance along the south coast, the influence of depressions from the west in winter is a modifying factor.

(3) Most of the rainfall is in summer, when in January the inter-tropical front is located over Southern Africa (see Fig 12), and there is a noticeable monsoon effect with winds drawn over the warm waters of the Mozambique Current. Although the east coast has a much drier winter season, there is no entirely rainless month; going westward, however, into the region of diminishing rainfall, the length and severity of the winter drought increases. Pretoria receives an average total rainfall of less than 1" between June and August, months which are rainless at Bulawayo and Livingstone. The region with a winter maximum of rainfall, deserves special notice. Cape Town's annual total is nearly 25", of which more than 20" fall between April and October inclusive. These rainfall conditions continue along the coast to near Knysna, between which place and Port Elizabeth is a belt the rainfall of which is unique in South Africa in being substantial in amount and well distributed through the year.

(4) The influence of aridity combined with high elevation is illustrated by the daily range of temperature. The interior has necessarily high maxima and very low minima, the former, of course, chiefly in summer, and the latter in winter. Night frosts are common in the higher regions with a well-marked winter drought, and at Gobabis, in Eastern South-West Africa, as much as 17° F. of frost has been recorded. Even along the coast of South-West Africa minimum temperatures occasionally approach freezing-point.

(5) A feature of great economic importance is the irregularity of the rainfall over most of the area. It is characteristic of interior regions tending to aridity that the rainfall should be spasmodic and associated with thunderstorms, and that it should be unreliable. Thus at Windhoek the months of January and February, with a combined average rainfall of 6", have been known to be totally rainless. These conditions, which prevail over the greater part of the area, have a serious repercussion on farming, the maize crop, for example, fluctuates considerably from year to year.

(6) Another hindrance to the effectiveness of the rainfall is the high incidence of evaporation. Over large areas of reasonably good rainfall the evaporation, as measured from exposed water surfaces, greatly exceeds the total precipitation.

Vegetation and Animals The vegetation depends, broadly speaking, more upon the amount and distribution of the rainfall than upon differences of temperature. The proportion of forest is relatively limited, but there is a very large area of woodland of a more open type. Mangrove swamps occur where rivers reach the Mozambique coast, which may be regarded as having a strip of tropical forest ascending the lower slopes of the plateau, though for a considerable distance north and south of Inhambane this coastal belt hardly exists. The belt of tropical growth ascends the Zambezi to the Victoria Falls, and the lower and middle slopes of the Nyasaland highlands have a similar heavy vegetation cover. The coast forests of Mozambique continue southward in the sub-tropical 'palm-belt' of Natal, which is a response to the warmth and moisture derived from the Mozambique Current, and contains species of palms, stinkwood (a laurel), black ironwood, lianes, and epiphytes typical of the more northerly strip.

With decreasing rainfall and a longer drought season combined with high elevation, the eastern forest thins out into savanna woodland stretching into the interior of Mozambique and into the Rhodesias. The thorn veld and bush veld of the Union continue it southward. While the tree-growth differs in character and density over this vast area, trees are usually deciduous because of the winter drought, not large in size, and often with flattish crowns. Where elevation increases the rainfall, and in moist valleys, the tree-growth may be more dense, but in the drier districts the proportion of more open country with grass increases, trees decrease in size, and drought-resisting shrubs become common, giving rise to a scrub type of vegetation. In Northern Rhodesia, towards the Congo divide, the amount of tree-growth increases, while in the Rhodesias generally grass and shrubs cover the ground between the scattered trees. Farther south the principal tree-growth is acacia, and the country has a park-land appearance with much long grass of little value for grazing. Acacia is common also in the thorn veld of the eastern part of the

Union, where spiny shrubs, often forming thickets, occur with short grass, it is of interest to note that the thorn veld is often referred to as the 'eastern grassland.' Open savanna woodland continues into the north-east of South-West Africa and is also found in the low veld and bush veld by the Limpopo. It is probable that this savanna woodland is not the climax vegetation of the region, for annual grass-burning in the dry season, which has long prevailed over the whole area, must have modified the original cover. The process favours grass at the expense of trees; those which survive do so largely because of their powers of resistance to the grass fires.

Among the woodlands may be included the Mediterranean area of the Cape corner. Here the adaptation is to relative summer drought, trees tend to be stunted, with small, stiff, leathery leaves, and there are many bushes and much scrubby growth, with a wealth of small flowering plants which are bright with colour when the rainy season begins in May.

The zone of woodland borders—on the north, east, and south—the more open savannas of Western Rhodesia and the temperate grass-land veld which prevails over a great part of the Transvaal and the Orange Free State. The temperate grassland is mainly the high veld, well-nigh treeless and with grass 2 to 3 feet high. With decreasing rain and a longer dry season, this merges into the 'Kalahari grassland' and the Karoo region. The Kalahari grassland—often called a desert—has a good deal of short grass, with tussock grass where the rainfall is very scanty, while there are stunted acacias, thorny bushes, and specialized water-storing plants. The Karoo may be regarded as semi-desert and has a vegetation distinctly inferior to that of the Kalahari. The proportion of barren ground increases in Namaqualand, and finally the Namib Desert is reached, where only an insignificant and specialized growth of drought-resisting plants occurs.

It is not surprising that the typical animals are herbivorous and fleet-footed. Many species of antelope are native to South Africa, including the eland, hartebeest, gnu, and springbok. Many animals are practically extinct except in the more northerly areas, for example, the gnu, quagga, zebra, buffalo, and elephant, as well as the rhinoceros and hippopotamus. Carnivores include the

lion (which is still found north of the Limpopo), the leopard, and the wild dog. Other animals of interest are several poisonous snakes, baboons, and monkeys, as well as wild ostriches in South-West Africa.

Population and Races The African population (which is often loosely referred to as Kafir) belongs mainly to the Bantu section of the Negro race. There are, however, many tribes, varying widely in vigour and intelligence. Before Europeans entered the region the chief Bantu tribes were found in the north-east and east, and included the warlike Zulus, the related Matabele (now occupying Southern Rhodesia), the less vigorous Mashonas and Bechuanas, the Barotse of North-western Rhodesia, and the Hereros of South-West Africa. These are typical agriculturists and cattle-keepers, living in kraals, which vary somewhat in construction with the tribes. In addition there are the Hottentots and Bushmen. The Hottentots, a negroid Hamitic race of rather small stature—probably due to Bushman admixture—once covered a large part of Africa, but retired into the drier south-west before the advancing Bantu tribes from the north-east. The Bushmen, who seem to be aboriginal, are found chiefly in the driest parts; they have yellowish skins and woolly hair, are of small stature, and are nomadic hunters.

The Dutch settlement at Table Bay, dating from the middle of the seventeenth century, led to a gradual white penetration eastward and north-eastward. This penetration was limited in the north by arid conditions, by 1778 it had reached the Great Fish River, 450 miles east of Cape Town. The region came finally under British rule in 1814, and the discontented Dutch settlers, following Kafir wars, began the Great Trek in 1836. In the meantime a British settlement had been made at Algoa Bay (Port Elizabeth) and another at Port Natal (Durban). In the eastern interior the warlike Zulus had been steadily and ruthlessly extending their influence southward. The trekking Boers penetrated what is now the Orange Free State and the Transvaal, and reached Natal; they inevitably became involved in cruel wars with the Zulus, with whom the British in Natal subsequently came into conflict. Zulu domination was broken, but there were repercussions northward. The Boers in 1837 drove the Matabele north of

the Limpopo, the latter decimated and enslaved the Mashonas of what is now Southern Rhodesia, and later, when British authority spread into this region, the British South African Chartered Company came into conflict with the Matabele, which trouble finally terminated in 1898

Although the British occupied Walvis Bay as early as 1796, there was little interest in this arid region until a German company obtained a concession from a Namaqua chief in 1883, eventually Bismarck was allowed to annex the whole area of what is now South-West Africa, with the exception of Walvis Bay, which remained British

By about the middle of the nineteenth century there were in effect in South Africa two British colonies—the Cape and Natal—and two Boer republics—the Transvaal and the Orange Free State. There had long been friction between the British and the Boers, and war broke out between them in 1880 and again in 1899, the latter war lasted until 1902. Between these two wars, the exploitation of the Witwatersrand goldfield in the Transvaal began. The federation of the four territories into the Union of South Africa took place in 1910, the Union is now a member of the British Commonwealth and a powerful influence, both socially and economically, in the affairs of Southern Africa. Following the First World War the Union took over, under the 'mandate' system, the administration of former German South-West Africa.

It may be noted here that the term 'Boer' (which means 'farmer') is still widely used but the white section of the Union population speaking Afrikaans—which is basically seventeenth-century Dutch—as its home language is now usually referred to as Afrikaner.

The penetration and development of the lands north of the Limpopo, initiated by Cecil Rhodes, was begun before the end of the nineteenth century, and the railway that promoted it—part of Rhodes' "Cape to Cairo" dream—keeps outside the two former Boer republics. The Rhodesias came into being under the administration of the British South African Chartered Company, but later were brought under the Colonial Office and are now federated with Nyasaland under the name of the Federation of Rhodesia and Nyasaland.

The Portuguese had not troubled to settle in the extreme south; their nearest settlement was at Delagoa Bay. In this region and in Nyasaland the Bantu tribes suffered from the Arab slave-trade, in connexion with the suppression of which the British established their hold over what is now the Nyasaland Protectorate.

Development. The economic history of Southern Africa combines the two principles of settlement and exploitation, and there is a complex colour problem, which takes somewhat different forms in different parts. The European everywhere depends upon African labour. In the Union the early settlers were farmers, and, so far as settlement in the veld was concerned, pastoral farmers. The discovery and exploitation of diamonds and gold had several very important effects; it was largely, if indirectly, responsible for the conflicts between the British and the Boers, it attracted many people to South Africa; it stimulated the development of railways in a region where the ox-wagon was the principal means of transport; it thereby stimulated and helped the farming industry, even if it led to the neglect of organized agricultural development; and it led to the recruitment of Africans for work in the mines and hastened the break-up of traditional tribal life. The mineral wealth, it should be noted, includes coal in Southern Rhodesia, Mozambique, Natal, and the Transvaal, while diamonds and metals have promoted settlement in the arid south-west. The mineral exploitation has passed through Southern Rhodesia into Northern Rhodesia, both richly mineralized, where, however, the white settlers, particularly numerous in Southern Rhodesia, are dependent on African labour, as is also the case in Nyasaland. In some districts Asiatics have been involved; Chinese were once recruited for the Rand mines and Indians for Natal's plantations. The Arab element is to-day prominent in Mozambique, and the Indian in Natal, while a few descendants of Malay slaves brought from Madagascar are found in Cape Town.

The economic products which constitute the principal exports of this region are varied. Apart from minerals, they include maize (as mealies, the staple food over most of the area) which is grown particularly in the Transvaal, the Orange Free State, Natal, and Rhodesia; pastoral products, such as wool, mohair, hides, and skins, from the veld and the Karoos; tobacco, widely

convenient ports in the east and south, and it is significant that the ports of Mozambique are essential to the economic life of Southern Rhodesia and the Transvaal. Nyasaland and the Rhodesias have important links with the port of Beira.

Largely as the result of the policy of expansion for which the late Cecil Rhodes worked in the last quarter of the nineteenth century, the consolidation of most of this region within the British Commonwealth has been achieved. British interests in Mozambique are considerable. Africans far outnumber Europeans in



FIG 142. AFRICAN VILLAGE, SOUTHERN RHODESIA

In typical savanna country

Information Department of the Federation of Rhodesia and Nyasaland

every political division, and it is difficult to foresee how the apparently conflicting interests of white and black will finally be resolved. The problem is complicated by the different standards and codes of European and African, and, now that tribal wars have ceased, by the greater increase in the number of Africans as compared with Europeans. In some areas African reserves are established, such as the Transkei Territories in the Cape Province, but these are now generally recognized to be inadequate. Not the least of the problems is the disintegrating effect upon tribal life and *morale* that arises when the African leaves the kraal for employment elsewhere. Coloured and Asiatic minorities

further complicate the problem of race relationships. It should be noted that Basutoland and Swaziland, as well as the Bechuana-land Protectorate, are in effect African areas, but supervised through the office of the High Commissioner for South Africa

MOZAMBIQUE (PORTUGUESE EAST AFRICA)

This territory lies between the Rovuma in 11° S. and latitude 27° S. It covers an approximate area of 298,000 square miles,



FIG 143 EUROPEAN HOMESTEAD, SOUTHERN RHODESIA
Information Department of the Federation of Rhodesia and Nyasaland

and has an estimated population of six millions, including about 50,000 Europeans—largely in Lourenço Marques and Beira—and a similar number of Indians, Arabs, and coloured people. Two chartered companies once shared the administration with the Portuguese Governor-General; in 1929 the Government took over the territory of the Nyasa Company, leaving the Mozambique Company, in which there were large British interests, to continue to develop and administer an area of 60,000 square miles lying between the Zambezi and latitude 22° S. This company's concession expired in 1941. These two companies did

important development work, and it may further be noted that British interests were responsible for the Zambezi bridge while the Union of South Africa Government has promoted the development of the port of Lourenço Marques. The western boundary

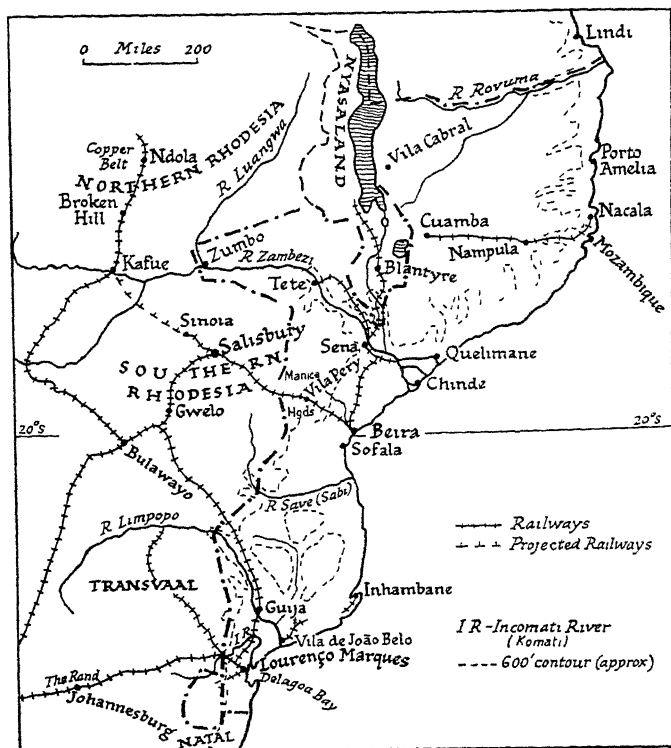


FIG 144. PORTUGUESE EAST AFRICA

reaches the eastern shore of Lake Nyasa and marches with Rhodesia and the Transvaal, with a long salient up the Zambezi to Zumbo.

The territory, which now ranks as a province of Portugal, was until recently divided into four provinces—Nyasa, Zambezia,

Manica and Sofala (the area formerly administered by the Mozambique Company and containing the port of Beira, which it established) and Sul do Save; the last lay south of the Save (Sabi) river, with the most developed part of the territory and the port of Lourenço Marques. This division has been replaced by one into nine districts, based on Vila de João Belo, Tete, Porto Amelia, Lourenço Marques, Beira, Inhambane, Quelimane, Vila Cabral, and Nampula.

Physical Features There is a continuous strip of coastal plain, generally narrow in the north, but south of Beira widening to almost the whole width of the country. Most of the higher ground is plateau between 2000 and 3000 feet in elevation, but this height is greatly exceeded beside Lake Nyasa and east of Lake Chilwa, where 7500 feet is reached, while the Manica plateau rises steeply to the high eastern rim of Southern Rhodesia. An important salient of lowland extends up the Zambezi, where Tete, some 300 miles inland, is only 400 feet above sea-level. The lower courses of the rivers are available for navigation, especially in the summer, when, however, they suffer from floods and may be visited by disastrous cyclones. The Zambezi, which has an extensive delta, is unfortunately blocked above Tete by the Kebrabasa Rapids, some 50 miles in length. It is noteworthy how the river and valley route led to the spread of Portuguese influence westward in this part of Africa at an early date, the cathedral at Tete dates from 1563. The temperatures are tropical, though modified by elevation over large areas, with a small coastal range, Mozambique ranges from 72° F. to 82° F., with 33" of rain; Lourenço Marques from 65° F. to 78° F. with 32". The considerable summer rainfall is in general heavier in the northern part. In winter there is a well-marked dry season from June to October.

Production. Development in the past has been hindered partly by lack of interest and partly by friction with the African population. But there are few areas in tropical Africa which offer such good soil, such a relatively reliable climate, and so few labour difficulties, either for plantation or mining work. East African developments have also stimulated interest here. Commercial production is largely in the hands of big companies, and is on plantation lines, but there is also expanding African cultivation.

Most tropical crops can be produced, and there is evidence of unexploited mineral wealth. The attitude of the Administration towards African labour is similar to that in Angola.

The coast swamps, especially in the neighbourhood of Beira, provide mangrove-bark, from which the extract (cutch) is now obtained in local factories. The principal forests are on the uplands, where hard timber resistant to the white ant is being worked. The forests also provide beeswax and wild rubber, but the collection of rubber, whether from the forests or from the few Ceará plantations, is of little importance. Small quantities of ivory are exported.

The Africans cultivate maize, millet, ground-nuts, simsim, beans, rice, manioc, tobacco, and cotton. While these are grown mostly for their own needs, African cotton production is particularly important in that part of the territory north of the Zambezi, providing the major part of the export of this crop. Another crop largely in African hands is cashew-nuts, of which there is a large export to India. Africans also provide large quantities of ground-nuts and a little simsim for export.

European farms on the Manica Highlands are well established, with maize as their staple crop, tobacco and temperate cereals are also grown. Plantation production elsewhere is important. Tropical fruits—bananas, citrus, and pineapples—are cultivated, notably in the Incomati valley of the south. Sugar comes chiefly from the Sena district of the Zambezi valley, and sisal from the area north of the Zambezi, especially in the hinterlands of Mozambique and Quelimane. There are millions of coconut-palms, notably in the coastlands north of the Zambezi delta, making the territory a very important producer of copra. A good deal of plantation cotton is grown in the Zambezi valley and farther south in the hinterland of Sofala. In connexion with this and other crops an irrigation scheme is operating in the Limpopo valley, based on a dam at a point below Guja, about 70 miles from the mouth, for the cultivation of a large area of rich alluvial land by selected immigrant European farmers on land hitherto subject to flooding. A dam on the Incomati river is also planned for the production of sugar, tropical fruit, and rice.

Tobacco, coffee, kapok, and castor oil are other cultivations,

coffee giving good results in the Inhambane district. A little tea is now being grown near the Nyasaland border.

Big game is plentiful, including the elephant. The only domestic animals of importance are cattle, which are not very numerous ($\frac{3}{4}$ million), and are kept chiefly on the uplands owing to the prevalence of the tsetse fly in the lowlands. The dipping-tank is widely used, as ticks are troublesome.

Minerals. Ancient gold-workings, possibly prehistoric, are numerous, and this metal is worked in the Manica Highlands, though only on a small scale. The Tete district has a rich coalfield, the Moatise field, near the surface, with seams up to 25 feet thick, and iron, copper, and other metals are known to exist in the neighbourhood. As this part of Africa develops the Moatise coalfield will increase in importance, especially as since 1949 it has been connected by rail with the line running from Nyasaland to Beira. The one colliery has at present only a small production. Systematic investigation of the mineral resources of the territory is now in progress.

Industrial Activities. There are numerous works engaged in processing such products as cotton, sisal, and copra, oil-expressing plants concerned with copra, ground-nuts, cotton, and mufarra-seed are specially important. Soap factories are found in the principal towns. Factory development is most prominent at Lourenço Marques, which makes flour, cement, and simple farm implements. At Vila Pery is a cotton mill, using local hydro-electric power. Salt is obtained by evaporation along the coast, especially at Mozambique.

Ports and Railways. A number of ports have already been mentioned, but Beira (population 40,000) and Lourenço Marques (population 100,000) are of outstanding importance. Beira's geographical situation gives it an enormous hinterland. Its railway to Nyasaland, carried across the Zambezi, has led to the capture of much of the trade of Chinde on the delta. Beira is also the port for the Zambezi valley and for the Manica Highlands, while its railway to Rhodesia gives it a large transit trade. Rhodesia is greatly interested in this port, where modern shipping facilities are available. The capital of Mozambique is Lourenço Marques, on Delagoa Bay; this is the most accessible port for the

Rand in the Transvaal, and its use by the Union of South Africa has long been governed by the Mozambique Convention, under which, in particular, it is used for much of the export trade of the Transvaal, especially in coal. Besides its main railway to the Rand, Lourenço Marques is served by a number of short lines into its immediate hinterland, in which there is much agricultural activity, while it is now linked, *via* Guija, with Southern Rhodesia. Lourenço Marques with its administrative functions, its industrial development, and its large general and transit trade, has grown rapidly. It has a much better harbour than Beira and handles a greater tonnage of goods, the latter port depends largely upon its transit trade for the Rhodesias and Nyasaland. It is significant that the rail link between Rhodesia and Lourenço Marques carries Northern Rhodesian copper and Southern Rhodesian asbestos, return freight includes petrol and oil.

The decayed port of Sofala is interesting in that it appears to have been the port for the old Rhodesian gold-workings; a line of forts has been traced between this place and Zimbabwe Mozambique (population 10,000) is situated on a small coral island in a well populated and productive region. A new port, Nacala, to the north of it was opened in 1951; from Nacala a railway runs southward and westward to Cuamba in the highlands east of Lake Nyasa, to which it will be continued. Inhambane, used only by coastal vessels, is also in a very productive area; it has a railway link nearly completed to Lourenço Marques with a branch to Vila de João Belo, a small port 30 miles up the Limpopo; the dam on this river with associated agricultural development should increase the latter's importance.

Trade. Having regard to its large area, the total domestic trade of the territory is not large. Leading the import values is cotton goods, mainly from Portugal; motor vehicles, petrol and petroleum products, railway material, and iron and steel goods are all important items. The United Kingdom and the U.S.A. both have significant shares of the import trade, 30 per cent. of which is derived from Portugal. Of the exports raw cotton leads, with sugar normally in second place. Copra, sisal, and cashew-nuts are other important exports, there being smaller values of other agricultural products, among which vegetable oils should

be noted. Portugal takes 30 per cent of the exports, chiefly cotton and sugar, the Union of South Africa being the second customer. The U.S.A. takes a good deal of sisal.

Imports greatly exceed exports in value. The difference is made up mainly from port and railway services connected with the transit trade and from the earnings of Africans from Mozambique, employed in the Rand mines. Under the Mozambique Convention the Rand mines are allowed to recruit about 80,000 Africans annually in return for guaranteeing a minimum transit trade through Lourenço Marques. Beira handles the oversea trade of Nyasaland and much of the mineral export of the Rhodesias as well as much of their general import trade.

THE FEDERATION OF RHODESIA AND NYASALAND

This federation—unusual in being between territories of differing status—began to function in 1954. The following table brings out the basic features of the area and estimated population (1958) of the territories involved.

	STATUS	LAND AREA (SQUARE MILES)	EUROPEANS	AFRICANS	OTHERS ¹	TOTAL POPULATION	AVERAGE DENSITY PER SQUARE MILE
Nyasaland	Protectorate	37,400	8,300	2,690,000	11,000	2,709,300	73.2
N. Rhodesia	Protectorate	287,600	72,000	2,220,000	8,100	2,300,100	8.0
S. Rhodesia	Self-governing Colony	150,300	207,000	2,420,000	14,500	2,641,500	17.5
		475,300	287,300	7,330,300	33,600	7,650,900	16.1

¹ Chiefly Indians and coloured.

Southern Rhodesia has a relatively balanced economy with important agricultural and mineral production and some development of industry; Northern Rhodesia is dominantly a producer of minerals; Nyasaland, with a small white population, is essentially an agricultural territory in which pressure on the land is notably great, leading to a substantial reserve of labour. The resources of these territories are, therefore, largely complementary, and economic integration is clearly envisaged in the powers given to the Federation which is equipped under a Governor-General with a

parliament of 59 members, including 12 elected Africans. Legislation affecting African interests has to be subjected to special examination. From another point of view the Federation may be regarded as a hindrance to growing Afrikaner penetration of the Rhodesias. Federation involved no change in the status of the



FIG. 145 PICKING THE LOWER LEAVES OF TOBACCO PLANTS,
SOUTHERN RHODESIA

Information Department of the Federation of Rhodesia and Nyasaland

territories Northern Rhodesia and Nyasaland continue under "the special protection of Her Majesty", the Federation is "to foster partnership and co-operation," leading to "the attainment of full membership of the Commonwealth." Federal powers cover external affairs, defence, customs, postal services, communications, and many other functions, including the higher education of all races. Certain powers—*e.g.*, research, health, migration—are "concurrent" African feeling has been resentful of the establishment of the Federation, the structure of which was (1960–61) under critical examination.

The vast area of the Federation has a peculiar shape with a narrow 'waist,' where the Congo 'pedicle' approaches the

Zambezi salient of Mozambique. It is essentially an inland plateau area with Rift Valley highlands on its north-east margins, it is crossed from south-west to north-east by a belt of relatively lower land marked by the Middle Zambezi and the Luangwa trench

While it is of interest that the leading agricultural export of each of these territories is tobacco, their present development in other ways makes it desirable to consider them separately.

NYASALAND

This protectorate, which includes 10,500 square miles of water, lies mainly west and south of Lake Nyasa, and broadly consists of three physical divisions: the Rift Valley occupied by Lake Nyasa and the Shiré river, the bordering highlands to the west, and the Shiré Highlands and Mlanje Mountains to the south-east. The Shiré Highlands are from 2000–3500 feet in general elevation, the lake-level is at 1560 feet, the highlands to the west have a general height of from 3500 to 4500 feet, rising in the Nyika Plateau to over 8000 feet. In the south-east, Mount Zomba reaches 7000 feet and Mount Mlanje 10,000 feet. The lake-level varies considerably; it has been known to decline 6 feet in the dry season. The Shiré is of little value for navigation, for its exit from the lake is silted up, and rapids obstruct its middle course. However, Port Herald, at 120 feet, in the lower reaches, can be reached from the Zambezi in the wet season. Lake Chilwa (or Shirwa), to the east, is shallow and brackish.

Climate Tropical temperatures are modified by altitude over the greater part of the region, and white settlement is said to be possible on all the highlands, including the Shiré Highlands, the chief area of such settlement, above 2500 feet. Another notable centre of white settlement is Lilongwe, at 3600 feet, west of the lake. But the complete suitability of this, as of other parts of tropical Africa, for white settlement is not yet fully determined. At the higher elevations the daily range of temperature is considerable, especially in winter, when night frosts are common, and snow has been known even in some white-settled districts. The wet season is, broadly speaking, from November to March; the total rainfall is about 45" in the Shiré valley, 50" on the Shiré

Highlands, 100" on Mount Mlanje, and probably a similar amount on the higher parts of the Nyika Plateau. There is a certain amount of dry-season rainfall on the highlands, and this restricts certain crops, such as tea and coffee, to areas with a sufficiency of it. Thunderstorms are common in the wet season.

Development Administration has operated by indirect rule through 'native authorities'—in effect, local councils—but African participation in the government is now established. The Bantu people belong to a number of tribes, the population has been built up largely by immigrant Africans and includes a considerable tribe expelled from the Zulu Confederation in 1823. Another important tribe, rapidly increasing and inhabiting the Cholo district, fled from Mozambique nearly half a century ago, and migration from that territory continues. Nyasaland is an overcrowded territory in the sense that the production of the land in the existing conditions is inadequate for the needs of the expanding African population. In consequence many Nyasalanders seek employment elsewhere so that at any one time fully a third of the able-bodied men are outside its borders, mostly in Southern Rhodesia. This is an unhappy position, for these men could do much to build up the agricultural economy that the Government is trying to establish. There is much 'trust land' upon which the agricultural effort of the administration is concentrated; co-operative growers' societies are encouraged; soil erosion is actively combated through the native authorities.

Livingstone first saw Lake Nyasa in 1859; missionary penetration and slave wars followed, and settlers, many from Scotland, gradually came to the highlands. When the protectorate was declared in 1891 settlers had 1600 acres under cultivation; they now occupy over three-quarters of a million acres; much of this is not actually under cultivation. A good deal of this occupied land is controlled by plantation companies who let Africans settle on undeveloped land in return for labour on the developed estates.

Wasteful methods of forest clearance in the past have reduced the area of forest and woodland to about 7000 square miles, the closed forest being confined to the wet districts. The principal timber is the Mlanje cedar, a variety found elsewhere in Africa

only in the Melssetter district of Southern Rhodesia, it provides a durable timber resistant to the white ant, and is being conserved. African mahogany also occurs. Eucalyptus-trees have been widely planted. There is evidence of great variety of mineral wealth in the old and faulted rocks of the highlands, but not generally in useful quantities, some kyanite is mined near the railway, about 60 miles north of Blantyre, and deposits of bauxite in the Mlanje district could be worked if they were made reasonably accessible.

The Africans cultivate primarily for their own needs, their crops include cassava, millet, rice, Kafir corn, sweet potatoes, beans, maize, and ground-nuts, of these, maize and beans may be regarded as staples. Nevertheless, to-day their production of both tobacco and cotton is far greater than that from white plantations, though the

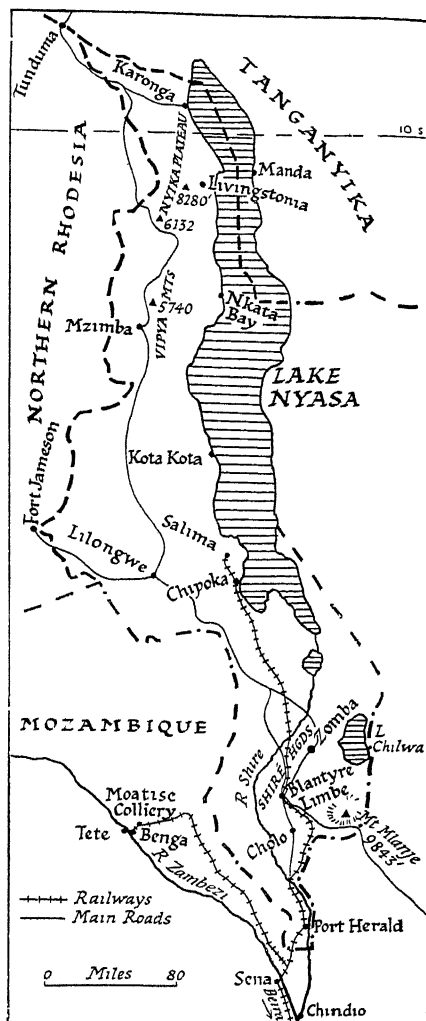


FIG 146. NYASALAND

quality is not so high, African crop

standards are rising. The history of the white plantations—which need machinery and scientific farming owing to labour conditions—is instructive in showing the widespread experiments in the selection of suitable crops, and the dependence on an outlet if a region of this character is to be developed. Tobacco in many recent years has been the leading export. Cotton once headed the list of export values, upland varieties are cultivated, and the native cultivation, encouraged by Government distribution of seed, has expanded, especially in the extreme south by the Shire



FIG. 147 PICKING TEA, MLANJE, NYASALAND

and in the Central Province. The production of tea from plantations on the south-east slopes of the Mlanje Mountains is now well established, and the Cholo district, south of Blantyre, has also developed this crop, which now rivals tobacco as the most valuable export. Coffee was once so successful that it was adopted for the country's armorial bearings, but now it is of small importance. Sisal cultivation has made no progress, but maize has importance, especially in the Lilongwe area, though most Nyasaland maize is grown by Africans. Tung plantations have recently been established, notably in the Cholo district, but interest in this crop is at present hindered by the expansion of tea.

Chillies, strophanthus, and beeswax are among minor products. The number of stock is limited, owing to the presence of the tsetse fly, the cattle are chiefly African-owned. The weekly dipping of all cattle is encouraged to combat tick-borne diseases; there is a small export of hides, and an expanding one of ghee.

The aim of building up a viable economy is being actively pursued, particularly in regard to African cash crops. Rice has received attention and is now being cultivated in the Nkata Bay, Karonga, and Kota Kota districts, while an irrigation project is being developed in the Lake Chilwa area. There has been some expansion of ground-nut cultivation in the Central Province, but an attempt to establish tung as a crop in the Northern Province has not been very successful. On the other hand, a good beginning in this area has been made with the cultivation of *arabica* coffee. The Nyika Plateau is planned as an area for afforestation. Preliminary work has begun on a big scheme to stabilize the level of Lake Nyasa, to control the Shire river, and to develop on it a hydro-electric power scheme which would also serve irrigation.

Industrial development is almost entirely confined to processing.

Towns and Communications. The chief European centres are Zomba, Blantyre, Cholo, and Lilongwe; of these, all but the last are in the Shire Highlands of the Southern Province. Zomba (500 Europeans), away from the railway, is the administrative centre in a district with many tobacco estates. Blantyre (2000 Europeans) may be called the commercial capital of the Protectorate, and has the Chileka airport near by. It was formerly the terminus of the railway which now goes on to reach the lake at Chipoka, with the railhead a few miles farther on. Blantyre has absorbed Limbe, where there are large modern facilities for processing tobacco. Cholo, off the railway, is a centre for large tea estates.

The country's main road to the north passes through Cholo and Blantyre, to reach Lilongwe in the Central Province, in a district important for maize, tobacco, and ground-nuts, largely African-grown; thence the road passes through the western highlands to join the Great North Road at Tunduma, on the Northern Rhodesian border.

The railway between Blantyre and the Zambezi was opened in

1908; it immediately stimulated development, which was further assisted by the completion of the Zambezi Bridge at Sena in 1935, giving unhindered access to Beira.

Trade. With what is still mainly a subsistence economy and without great mineral resources, the trade of Nyasaland is relatively small. Imports involve only small quantities of foodstuffs, which include sugar; of manufactured goods cottons form the largest single item, while materials for transport purposes (motor vehicles, railway material, petrol and oils) and material for development work (machinery, iron and steel goods) are of great importance. Tobacco and tea between them provide about 80 per cent. of the export values; cotton and maize are significant among the remaining exports, which include ground-nuts, hides and skins, and tung-oil. The United Kingdom sends nearly half the imports (India, Japan, Southern Rhodesia, and the Union of South Africa being other notable suppliers) and takes about 60 per cent. of the exports; the Congolese Republic and Sierra Leone take an appreciable quantity of tobacco.

THE RHODESIAS

The Zambezi separates Northern from Southern Rhodesia, and is more than a political divide. Northern Rhodesia covers twice the area of Southern Rhodesia, is nearer the equator, has a heavier rainfall, has many fewer white settlers, and is distinctly less favourable for Europeans. Until 1923 each was administered by the British South Africa Chartered Company, but then Southern Rhodesia became a self-governing colony, and a year later the Crown relieved the company of the administration of Northern Rhodesia. Southern Rhodesia stretches across the Limpopo-Zambezi divide and Northern Rhodesia across the Zambezi-Congo divide, but, broadly speaking, they together constitute a large area of plateau seldom below 3000 feet and nowhere reaching 6000 feet, except on the extreme eastern border of Southern Rhodesia and in the Muchinga escarpment that overlooks from the west the rift valley of the Luangwa in Northern Rhodesia. Southern Rhodesia has big farming and mining activities, but although there has been a remarkable development of Northern

Rhodesia's mineral wealth, white settlement for agricultural activities is limited.

The ancient crystalline foundation of Africa covers the greater part of the area and occupies the higher ground; it consists mainly of granite and gneiss, and on the surface is largely lateritized into a red ferruginous clay. Younger sedimentary rocks occur by the Zambezi and in Barotseland, and in Southern Rhodesia contain large areas of coal-bearing formations. The rainfall, which comes in summer, is greatest in the east and north, and declines towards the west and south-west, so that Barotseland and a belt in the south-west of Southern Rhodesia have a rainfall which in places falls below 15". The rainy season tends to be longer towards the Congo. In the middle of the wet season the rainfall is usually of a heavy convectional type. The total rainfall is subject to wide fluctuations, and this, among other things, has greatly handicapped cotton-growing in Southern Rhodesia. The maize crop is also seriously affected by these variations. Though often referred to as veld, the plateau vegetation is largely of the park-land type, with trees more numerous in the east and north, but merging into dry pasture and scrub in the more arid regions. Big game is still fairly plentiful, and a little ivory is obtained. Mining development and the modification of temperature by altitude have mainly determined the distribution of the European population.

The Rhodesias have long and costly railway links with tidal water. The major link between the two territories is the "Cape to Cairo" railway from the south which passes through Bulawayo and the Wankie coalfield in Southern Rhodesia, entering Northern Rhodesia at the Victoria Falls and going on through Broken Hill to the Copper Belt. This railway, often congested, brings Wankie coal to the copper mines, which until recently had also to rely upon timber, cut for fuel, and upon small local hydro-electric stations. Acute shortage of power, actual and prospective, prompted the huge Kariba Gorge power scheme on the Zambesi (a site on the Kafue was also considered). The 175-mile-long lake behind the massive Kariba Dam is steadily filling. The installation of the first six (out of a planned twelve) sets of generators is approaching completion, and power (first available in 1960) is

being transmitted to the Copper Belt and other parts of the Federation. More than 50,000 rather primitive displaced Africans have been settled in new villages up to 160 miles away. The Kariba project is a Federal enterprise. Much of both the import and the export trade of the federation passes through Beira, and this route is subject to congestion. The link with Lourenço Marques (*see* p. 372) has brought relief, and other railway developments are contemplated. It would seem that the development of the Rhodesias has outstripped the existing railway facilities.

Northern Rhodesia

This Protectorate is mainly drained to the Zambezi, by the Kafue and the Luangwa, the latter occupying a remarkable tsetse-infested trench; but in the northerly projection of the territory are found the head-waters of the Congo, with the brackish Lakes Bangweulu and Mweru, and the southern end of Lake Tanganyika, which also has a tendency to salinity. The highest ground is along the crest of the Muchinga escarpment and by the Tanganyika-Nyasaland border. Much of the lower ground in the west of the country is troubled with 'fly,' so that comparatively few cattle are kept by the Africans, and labour is relatively easy to obtain. The Katanga district and Southern Rhodesia recruit labour here, as do the local mines.

Productions. There is little closed forest, and small stands and strips of timber along the perennial streams of the north-east contain trees that are related to those of the Congo region. Elsewhere there is much savanna woodland; there is a number of sawmills in the Copper Belt, and Livingstone has a plywood and furniture industry, based principally on Rhodesian teak and mahogany, cut in the Zambezi valley to the west. Steps are being taken to conserve timber resources and to undertake afforestation.

The Africans cultivate primarily for subsistence—a little rice in the wetter north-east but more generally maize, millet, and ground-nuts. They are slowly being interested in cash crops, these include maize along the railway and in the Eastern Province, cotton in the Upper Luangwa valley, and tobacco in the east in the Fort Jameson area. A scheme for sugar cultivation is being developed in the Chirundu district by the Zambezi.

Nearly two-fifths of the land is completely reserved for Africans but much of this lacks adequate water supplies and is tsetse infested. Barotseland is an African reserve; the rivers flood in summer, and in the dry season the region has a very parched, sandy aspect. Transport is difficult. The Africans raise a little maize and Kafir corn in the wet season and keep a few animals.

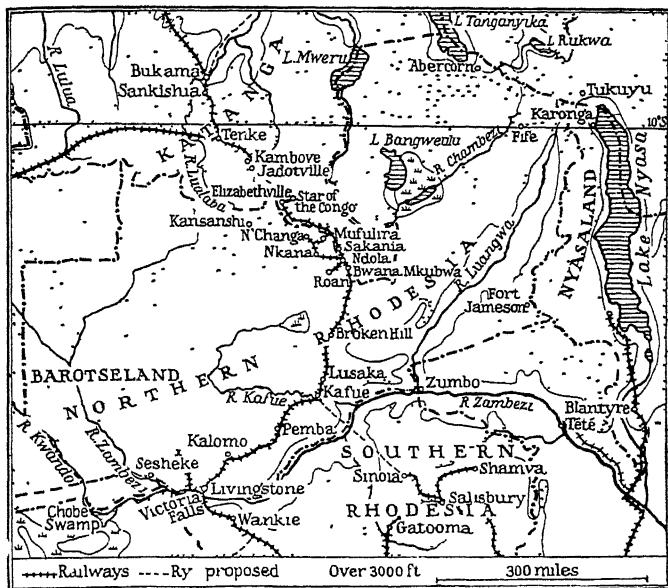


FIG 148. NORTHERN RHODESLA

Railway development is almost entirely limited to the one trunk-line, with short branches in the copper area adjacent to Katanga. Note the shortening of the railway route from Northern Rhodesia to Beira that would be secured by the proposed Sinoia-Kafue cut-off. Fort Jameson is isolated east of the Luangwa trench. Its chief connexions are by road to Salisbury and Blantyre.

The railway keeps generally to the higher ground, and along its route a good deal of land has been taken up by Europeans. The growth of a market in the mining areas has encouraged European farming, and there are now about 1500 such farmers, interested particularly in tobacco and maize. Tobacco has become specially

important in the Kalomo and Choma districts. Ground-nuts and millet are also grown, as well as a little cotton, while cattle are raised for both beef and dairy purposes. Lusaka is the principal agricultural centre. Mechanization only partially offsets the shortage of African labour on the European farms. Away from the railway, the principal European centre is Fort Jameson, in



FIG 149. THE MINE COMPOUND, NKANA

The smelter is in the background

Information Department of the Federation of Rhodesia and Nyasaland

the east of the territory, an important centre of tobacco cultivation. The tobacco is now sent to Salisbury, in Southern Rhodesia, for auction. By the Tanganyika border is Abercorn, at 5000 feet, with a handful of whites; coffee is grown in the district.

There has been remarkable mining development. Broken Hill was for long, with its lead and zinc ores, the chief mining centre and attracted the railway from the south. Zinc is the more important, but modernization of the plant is helping to maintain a substantial production of lead; vanadium also occurs here.

Copper is now the dominant mineral of Northern Rhodesia, a leading producer of this metal. Careful preparatory work in the Copper Belt by the Congo border, including aerial survey, health measures, and branch railways, brought this area to the producing stage. The principal mines at present are Roan Antelope, Mufulira, Nkana, and Nchanga, with each is associated a township with a substantial European population. The Kitwe-Nkana centre is the largest, and has 7200 whites and 65,000 Africans. Ndola (4500 whites, 35,000 Africans) is, however, the chief town of the Copper Belt because of its rail and road connexions. There are important new developments the Chibuluma mine, near Kitwe, has come into production, as has the Bancroft mine, near Chingola (the Nchanga township); the Kansanshi mine, however, has operated only with a high price for copper. The ores have a relatively high copper-content, and production costs, but for power and transport difficulties already referred to, would be relatively low. The smelters produce both 'blister' and electrolytic copper—an increasing proportion of the latter. Cobalt is a very important by-product of the Nkana and Chibuluma mines.

In the dry season the surface of the plateau is dusty, and in the wet season it is sticky. Road development is proceeding, and the main roads are usable in all weathers. Strategically placed bridges have promoted road communications, the Victoria Falls bridge is both a rail and road bridge, the Otto Beit bridge across the Zambezi at Chirundu brings in the Great North Road from Southern Rhodesia. This road goes on to Lusaka, Broken Hill, and Mpika to leave the territory for Tanganyika at Tunduma. The Great East Road leaves Lusaka for Fort Jameson, crossing the Luangwa by a bridge 820 feet long. Apart from branches in the Copper Belt, the only railway is the trunk line which reaches Livingstone *via* the Victoria Falls bridge. Livingstone (3700 Europeans) at 2970 feet was formerly the capital; it has a large international airport, serves agricultural and timber development in the Zambezi valley, and benefits from a substantial tourist traffic. The line goes on to Lusaka (7000 Europeans), the capital, with an important airport, large elevators for maize storage, and some light industry, to Broken Hill (3400 Europeans), and the

Copper Belt, entering the Congolese pedicle a little beyond Ndola, which has some factory industry connected with local needs, besides refining copper. The Fort Jameson area depends on roads and also makes use of Lake Nyasa and the route through Nyasaland.

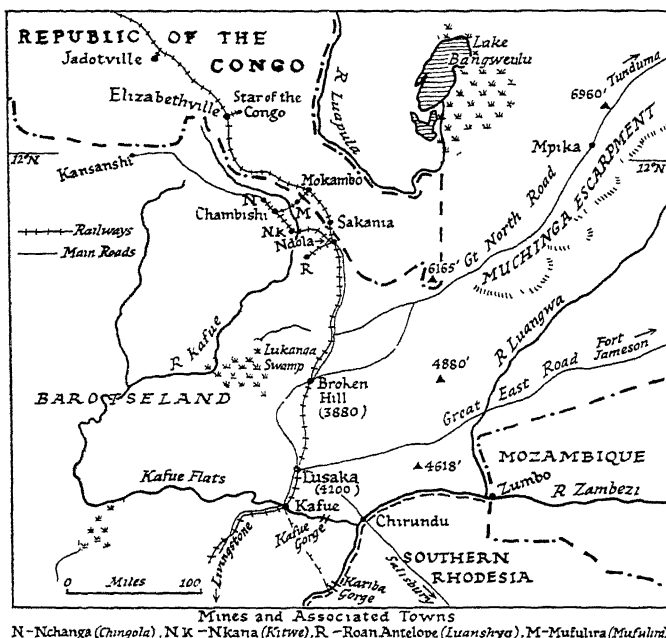


FIG 150. CENTRAL NORTHERN RHODESIA AND THE COPPER BELT

The new Chibuluma mine is half-way between Nkana and Chambishi, Bancroft is about ten miles north of Nchanga

The chief industrial development is connected with the processing of raw materials—ores, tobacco, grain, oil-seeds. The mining area has a certain number of factories—cement, bricks, tiles, and pipes

Trade The economic health of the Federation is largely dependent upon the maintenance of the highly valuable mineral exports of Northern Rhodesia, which give this territory a notably

large trade. It is not self-supporting in foodstuffs—maize, wheat, and sugar in particular being imported. Cotton piece goods, textiles, and apparel form another important class of imports, but clearly the major items will be connected with the maintenance of mining and transport. Machinery, iron and steel goods—including pipes and galvanized iron, motor vehicles, and tractors—petrol and oils, together make up the bulk of the imports. Cigarettes, pottery, glassware, chemicals, paper, leather and rubber goods may also be noted. Copper in various forms provides about 90 per cent. of the export values, lead, cobalt, and zinc make up most of the rest of the mineral exports. Tobacco is the only significant agricultural export.

The United Kingdom sends rather more than a third of the imports and is rivalled by the Union of South Africa. Southern Rhodesia is also a substantial supplier, while the U.S.A. notably sends machinery. The United Kingdom takes two-thirds of the exports, the rest going to other industrial countries, including the Union of South Africa. While a large proportion of the imports arrive by the Southern route (*i.e.*, along the trunk railway), the metal exports have hitherto gone out by rail to Beira; the rail link between Southern Rhodesia and Lourenço Marques now takes much of this traffic.

Southern Rhodesia

Southern Rhodesia lies between the Limpopo and the Zambezi. The chief early interest of the Europeans was in mining, but farming and industry are both of great importance to-day. Nearly half the Europeans live in Salisbury and Bulawayo and their suburbs. In recent years many settlers have been Afrikaners.

Physical Features. The relief is simple. A belt of land over 4000 feet runs from south-west to north-east through the middle of the country, rising to over 5000 feet towards the eastern border, which is mountainous in character, reaching 8500 feet in the Inyanga district and over 7000 feet in the Melsetter area. This elevated belt may be termed the 'high veld.' A well-marked scarp often marks the descent to the 'middle veld' (2000–4000 feet) in which differential erosion has developed many isolated hills known as koppies. The 'low veld,' below 2000 feet, troubled with tsetse,

lies by the Zambezi and Limpopo and by the tributaries which run down to each river from the high divide, the principal trench being that of the Sabi river, in the south-east, in this belt there is often a high escarpment—1000 feet or more. In the west of the territory is some drainage to the Makarikari depression. The

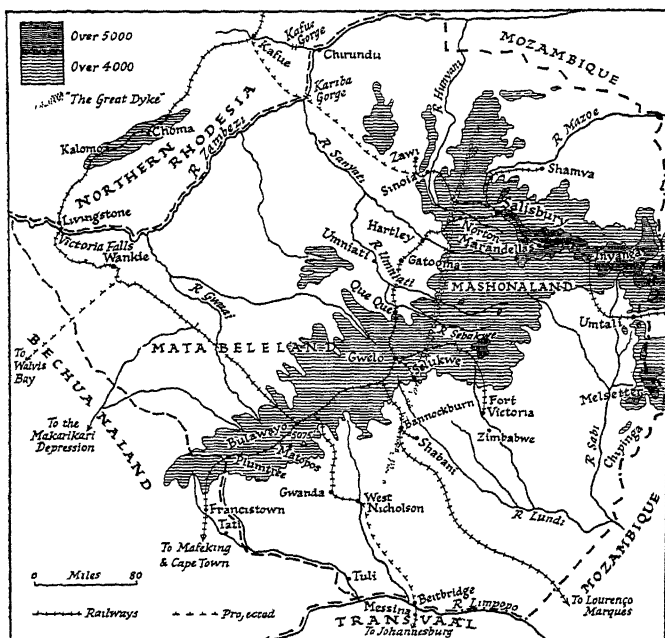


FIG. 151. SOUTHERN RHODESIA

The relation of the railway to the high ground is illuminating. Note the Umtali 'gateway'.

Based upon a map in the "Year-book of the Colony of Southern Rhodesia"

lowest ground is at 660 feet, where the Limpopo leaves the country. Granite and gneiss cover half the total area, and form the higher ground. Other intrusive rocks occur with them, including a remarkable dyke of norite and related intrusive material about four miles wide, stretching from north to south through the middle of the country from midway between Sinoia

and Salisbury nearly to West Nicholson.¹ At intervals it is particularly rich in chrome ore and asbestos. All these igneous rocks are mostly decomposed into a clay or loamy soil on the surface. These derived soils vary in quality and include 'black vlei soil,' or 'black plateau soil,' which conserves water better than most of the others. Primary sedimentaries appear in the extreme south-east, but a great belt in the north-west has deposits of Secondary age, including coal-bearing formations by the Zambezi, and there is a large Tertiary sandy area on the Bechuana-land border north of latitude 20° S and stretching east of the Gwaai river.

Climate and Vegetation. The chief white settlement is above 4000 feet; 21 per cent of the area is above this height, at which the mean annual temperature is about 66° F.

The rainfall by the Limpopo is below 15", otherwise it broadly increases eastward from an average of 20" in the west to over 40" on the eastern highlands. Very scanty rain marks the dry season, from April to September; the second half of the wet season, from January to March, brings the greatest precipitation. Though variable from year to year, the annual rainfall is on the whole steadier than in many other parts of South Africa. Salisbury, at 4831 feet, ranges in temperature from 57° F. to 71° F., and averages 33.4" of rain, barely 1" being the total for May to September inclusive. Bulawayo, at 4400 feet, ranges from 56° F. to 72° F., with nearly 24" of rain. It is obvious that agriculture must be chiefly concerned with summer crops, unless irrigation be possible, fortunately the granite, especially in the east, retains much moisture, and perennial streams are common, though much reduced in the dry season.

The prevailing vegetation is of the park-land type, often called 'tree veld,' with spaced trees allowing a main cover of grasses and bushes. It has a dry character in the west and south-west where the baobab is common. Much of it in the east is classed as savanna forest, and there is even a ~~small~~ evergreen forest on the eastern borders in the gullies and trenches of the Melssetter and Inyanga districts. Attention is being given to conservation, as timber

¹ Though commonly called the Great Dyke, it is now thought probably to be the 'root' of a great laccolith.

provides shelter for stock, limits erosion, and supplies fuel. Mining and railway development are stimulating a timber industry; settlers commonly plant gums and other trees round their farms.

Settlement and Productions. About 40 per cent. of the land area (96 million acres) has been earmarked for African reserves, scattered over the country, and for other African purposes, including purchase by Africans. Most of the rest, the more elevated land, is reserved for Europeans: about one-fifth of this has been alienated, only a third of which is in European farms. Substantial easement of the Land Apportionment Act in favour of the Africans is planned. Their reserves hold over 60 per cent. of the Africans, the remainder being in the unalienated areas, in the towns (rapidly growing), on the European farms, or about the mines. It is estimated that at any one time nearly 400,000 Africans—mostly adult males—are living within what is described as ‘the European economy’ Urbanization of the African is rapidly growing, although the number of Africans continuously resident in towns is still small. It should be noted that a good deal of migratory labour comes to Southern Rhodesia, especially from Nyasaland, on the other hand, many Africans from Southern Rhodesia seek work in the mines of Northern Rhodesia.

In the African reserves traditional tribal life goes on, though modified by modern influences. Shifting cultivation, grass-burning, and overstocking continue, but instructors and supervisors are spreading improved methods of land use, and community demonstrators are encouraging better housing, sanitation, and social life. Maize is the staple African crop; Kafir corn (sorghum) is also important. The production of cash crops by Africans is not as yet very large; they make some contribution to the maize surplus, grow most of the ground-nuts (though the production is not large), and contribute substantially to the cotton production. In the Sabi valley is an irrigation scheme in a semi-arid reserve: varied crops are grown here. The reserves are inadequate for the growing population, and soil-conservation practices are encouraged—grass buffer-strips, contour cultivation, and crop rotation. Cattle form a very important part of the African economy; Africans own about three-fifths of the 3 million cattle. In 1896 rinderpest decimated the cattle population, and later other diseases

wrought havoc among the regenerated herds. The use of the dipping-tank is now widespread among the Africans, and the inoculation of cattle is encouraged. Relatively small numbers of sheep and goats are kept.

The white settlers are found mainly on the belt of highland, which the railway largely follows. Cattle provide one of their chief interests: the herds are mostly based on the small hardy African cattle, improved by crossing—especially with shorthorns and Herefords. Cattle-raising predominates in the drier south-west, but is important throughout the farmed area, and Gwelo is a large market for cattle, and many beasts are sold for the Katanga and Johannesburg markets; cold-storage facilities are expanding, and to-day significant exports of beef are made overseas. West Nicholson has meat-extract works. Southern Rhodesia is not very well suited to dairying, but this has developed on some of the moister soils, *e g*, those of the Great Dyke, and has importance round the larger towns, in which creameries are established. Butter often needs to be imported. Pig-breeding, assisted by local supplies of maize and by a number of bacon factories, has made progress, and small surpluses of bacon and pig products are achieved. Sheep are few, but large numbers of poultry are raised, and there is a big egg production.

Maize is the chief crop; the commercial cultivation is chiefly on the wetter east, and the quality is normally high. The principal producing districts are in the regions marked by Salisbury, Sinoia, Hartley, and Shamva, representing the area of densest European settlement, and the production is largely mechanized. Sorghum, of which improved varieties from Sudan and America have been introduced, is now an important alternative crop to maize, both are largely grown for fodder. The maize areas also grow most of the tobacco crop; both Virginian and Turkish varieties are grown, though relatively little of the latter, and much is suitable for cigarette manufacture. The expansion of tobacco production has made Southern Rhodesia a leading exporter of this crop. Cotton cultivation is fairly well established, despite labour and other difficulties, and large areas are suitable for the crop, for which Gatooma, which has a cotton research station, is a centre. Haricot and velvet beans, ground-nuts, and sunflower

(grown chiefly for green fodder) are other cultivations, sugar production is expanding in the lower Lundi valley, and this crop is developing along the Zambezi in the Chirundu district, there is a small production of tea in the Chipinga district. Most irrigation schemes are small local ones, but the Mazoe reservoir, about 30 miles north of Salisbury, is a large one, and there is another about 17 miles south-west of Fort Victoria. A recent major scheme is located on the Sebakwe river about 40 miles from Salisbury, this is a triple-purpose enterprise for hydro-electric power, for industrial water supply (especially to the big thermo-electricity station at Umniata), and for irrigation. Irrigation particularly serves citrus cultivation, mainly oranges, but wheat (a dry-season crop), potatoes, vegetables, and fodder crops are also grown. Citrus fruits are also cultivated in the Sinoia and Umtali districts, while apples and other deciduous fruits do well in the higher eastern districts, notably round Melsetter. A recent development has been the extensive planting of wattle (acacia, the bark of which is rich in tannin) in the region between Inyanga and Chipinga.

Mining. Mineral discoveries brought the railway to the country. Mining employs to-day some 65,000 persons, including over 2500 Europeans. The country is scattered with the remains of an ancient and mysterious gold-working and agricultural civilization, remains of which are seen in the famous ruins at Zimbabwe, just south of Fort Victoria. Much gold gained in modern times has come from the old workings. Gold is worked at many places along the railway from Bulawayo to Umtali, Gatooma being an important centre; the Gwelo and Salisbury districts are also productive. Although most alluvials have been worked out, it is noteworthy that small workers as opposed to large companies contribute a significant share of the output by working small reefs that would be uneconomic for large-scale methods. Chrome ore comes chiefly from a hill in the Great Dyke composed almost entirely of the mineral at Selukwe; most of the rest comes from the Salisbury district. Asbestos is worked in a belt from Bulawayo to Fort Victoria, notably in the Shabani district; the quality is high, and the production has greatly expanded. Southern Rhodesia is one of the world's chief suppliers of chrome ore and asbestos. Iron ore (hæmatite) is being exploited for an expanding iron and steel

industry in the Que Que area. In the Sabi valley east of Fort Victoria copper ore is mined, it is taken by lorry to Messina in the Transvaal for smelting. There is some small production of tungsten, scheelite, tin, and silver, while arsenic, platinum, wolfram, mica, and lead also occur. Coal is worked at Wankie, favourably situated on the railway to supply coal and coke to the Copper Belt of Northern Rhodesia. There are enormous reserves of good steam and coking coal in thick seams, and the annual



FIG 152 COKE-OVENS AT WANKIE COLLIERY

Information Department of the Federation of Rhodesia and Nyasaland

production is being expanded to 5 million tons. At present the demand for Wankie coal in this part of Africa exceeds the production, and attention is being given to the possibility of open-cast workings some distance to the south. Large resources of easily extractable coal have been proved in the Sabi valley, in the south-east of the country; in this same area are deposits of iron ore.

Industrial Development There is, of course, a great deal of processing of raw products, notably tobacco and minerals. There are creameries in the larger towns, in which also soap works are

often found, and the refrigeration and processing of beef and pig-meat have much expanded. Extensive building activity supports cement works and brick and tile factories, somewhat handicapped by variable supplies of coal. The larger towns now have many factories to meet local needs—foundries, clothing, furniture, confectionery, and the like. More significant are the modern steel works at Que Que, where local iron ore is smelted, and the cotton industry of Gatooma, where there are State spinning mills and



FIG. 153. IN THE QUE QUE STEELWORKS

Information Department of the Federation of Rhodesia and Nyasaland

private weaving establishments. This cotton industry absorbs the local production of raw cotton, and makes cheaper grades of yarn and cloth. Salisbury has a significant machine-tool industry as well as textile and fertilizer factories.

Towns and Communications. Strung along the railways, which total 2700 miles, are most of the towns; they are laid out on modern lines, and the larger ones have modern amenities. Some have grown very rapidly since the Second World War, and with the increase of their European population has come an even greater increase in the African population. As in other parts of inter-tropical Africa, urbanization is proceeding rapidly.

Salisbury (with suburbs, 76,000 Europeans, 140,000 Africans) was founded in 1890 and is not only the Southern Rhodesian capital, but also that of the Federation. It is a railway junction on the main line to the port of Beira and is the chief market in the country for tobacco, stock, and maize; its tobacco auction sales are the largest in the world, and it is in the heart of the chief agricultural area. It has many processing factories and a good



FIG. 154. SALISBURY—THE BUSINESS SECTION

Information Department of the Federation of Rhodesia and Nyasaland

deal of light industry, while its diverse educational activities now include an inter-racial university college. Its importance would be increased if the long-contemplated Sinoia-Kafue railway link should be completed, which would 'short-circuit' Northern Rhodesia's route to Beira. Bulawayo (with suburbs, 47,000 Europeans, 100,000 Africans) is where the line serving the main settled area branches off from the 'Cape to Cairo' line; it is also an important road centre in a district yielding gold, cattle, and cotton, and is the leading industrial town, with railway engineering, steel works, and factories dealing *inter alia* with soap,

bacon, sugar, beer, clothing, and printing. Gwelo (7000 Europeans) is sometimes called 'the capital of the Midlands', it is an important maize and cattle market in a district also yielding gold and chrome ore, and is growing as an industrial centre. Branch lines go to Shabani and Fort Victoria, the latter is the centre for the Zimbabwe ruins. Commanding the 'gateway' to Beira through the eastern highlands is Umtali (7000 Europeans) with the Inyanga district to the north and the Melsetter district to the south. Umtali is an important agricultural centre, at about 3600 feet, for tobacco and fruit, and has railway works and processing industries. Melsetter is rather isolated in a district of rich soil and plentiful rain, wheat and temperate fruits are grown.

Other railway developments, actual and prospective, are important. The rail link from Bannockburn to Lourenço Marques gives Southern Rhodesia relatively easy access to a second port on the Indian Ocean. From a point north-east of Bulawayo a branch line runs to West Nicholson, whence a road goes to Beitbridge, on the Limpopo, which is reached by a railway from the south. A connecting rail link has long been contemplated. Another proposed railway would run from the neighbourhood of Wankie through Bechuanaland to give access to Walvis Bay.

Motor transport is vital to the economy of the country, and the road system is constantly improving. Distances are great, and typical main roads, which cannot economically be properly surfaced over their whole width, have either an 11' strip of bitumenized surface or two narrower strips suitably placed for wheeled traffic. Many 'drifts' (fords) have been replaced by low-level concrete bridges out of use only during the short flood season.

Southern Rhodesia occupies an advantageous position in South Africa in regard to neighbouring markets for agricultural products, and as railway projects materialize overseas markets should expand. The Victoria Falls and the Zimbabwe ruins attract many tourists, as does the grave of Cecil Rhodes in the Matopo Hills.

Trade. Southern Rhodesia has a large trade. Imports include substantial values of foodstuffs, e.g., wheat, sugar, tea, and very large values of manufactured goods, especially mining and railway equipment, machinery, iron and steel goods, motor vehicles, cotton piece goods, other textiles, and clothing. Petrol, fertilizer,

leather and rubber goods, timber, earthenware, pottery and glass, books, paper, and many miscellaneous manufactured goods are imported. By far the largest single export commodity is unmanufactured tobacco. Minerals, especially asbestos, gold, and chrome ore, provide large export values, while coal is also significant. More than half the tobacco and most of the minerals go to the United Kingdom; Australia is also a notable customer for tobacco. Beef is exported, largely to Northern Rhodesia and the Katanga area, but also to Europe, while hides provide a substantial item. Maize is a fluctuating export and in a bad year may even be imported. There are small exports of pig products, oranges, and clothing, mainly to near-by markets.

Between 40 and 50 per cent. of both the import and export trade is with the United Kingdom, which sends notably machinery, manufactured metal goods, motor-vehicles, and textiles. The Union of South Africa, advantageously placed, supplies a quarter of the imports and takes a substantial share of the exports. Northern Rhodesia is a considerable customer, and the trade with the U S A and Western Germany has some importance.

Southern Rhodesia's position in relation to the railway development of Southern Africa gives it an important re-export trade, notably with Northern Rhodesia, re-exports to that territory including tea, spirits, textiles, and machinery.

The bulk of the overseas exports have hitherto gone out by Beira, and more than half the imports entered by the 'southern route'—*i.e.*, the "Cape to Cairo" railway. The railway route to Lourenço Marques has considerably modified this distribution.

THE BECHUANALAND PROTECTORATE

The Bechuanaland Protectorate is known as a High Commission territory, of which there are three, the others being Swaziland and Basutoland. Their status is unusual in that they are not administered through the Colonial Office, but are governed directly from the Crown through a High Commissioner for the three territories who is the legislative authority, each has a Resident Commissioner. All are strongly influenced by and to some extent dependent upon the Union of South Africa, which has more than once demanded their incorporation in the Union.

The Protectorate (see Fig. 155), covering 275,000 square miles, has approximately only 327,000 people, including 3200 Europeans, over half of whom are Afrikaners, and a few Asiatics. This figure reflects the generally arid character of the territory, but some observers believe that it could support many more people. It stretches between the Chobe Swamp in the north and the Molopo 'river' in the south. In the north central region is the series of depressions represented by the Okovango marshes, Lake Ngami, and the Makarikari Salt-pans. The Okovango brings a fair amount of water from Angola, but papyrus and reedy growths choke the river. The Botletle river carries most of the water to the Makarikari Salt-pans, and but little now escapes to Lake Ngami, which is normally a marsh, though in a year of heavy rains it may become a shallow lake. This may be due to progressive desiccation, but is more likely to have resulted from the choking of the river channels and the spreading-out of the water. Certainly the condition of the local tribes has declined since Livingstone's day. It is possible that recent slight earth-movements have helped to cut off water from Lake Ngami.

In the east of the territory, where the elevation is highest (up to 5000 feet), runs that section of the 'Cape to Cairo' railway between Mafeking in the Union and Plumtree in Southern Rhodesia. This railway zone is the best-developed area, partly because of the railway and partly because of the modest rainfall (Palapye 18"). Associated with the railway are four blocks of land in European ownership, of these may be noted Lobatsi in the south and Tati in the north. The northern part of the territory, Ngamiland, is the region of the Okovango swamp and Makarikari depression; this region has in places 20" of rain, but the waterways are subject to flood and are choked with reedy growth. Costly channelling and drainage might open up possibilities of irrigation in this area, which may broadly be described as one of dry savanna woodland. The rest of the territory belongs to the Kalahari, a region of undulating sand belts and limestone outcrops. The baobab is occasionally met with, and large areas are studded with camelthorn and other trees, with sufficient pasture for stock-raising, which is notably carried on at Ghanzi, where there is a block of European land. But the central area, with

5" to 10" of rain, is a sandy one of very thin pasture, the home of the nomadic Bushmen, whose food is the flesh of game shot with poisoned arrows, supplemented with fruits and roots. In this region are water-storing plants, including a bulbous 'water-root' (a melon) that is sought by both man and wild animal.

Outside the central 'thirstland' the Africans live in villages, occupied mainly in rearing cattle and small stock, but also growing sorghum (kafir corn), their chief crop, maize, millet, and sometimes ground-nuts, crops that vary very much with the precipitation, so that grain often needs to be imported.

The Protectorate has an average density of population of one to the square mile, and the object of the administration is to develop the African economy. African reserves occupy nearly two-thirds of the country; the rest is Crown land, with the exception of the small European blocks already mentioned. The problem is to encourage the Africans, who are primarily pastoral, to grow more crops and to improve their herds. Great tracts are thought to be good ranching country, with a carrying capacity of one beast to 50 acres, but in the absence of surface-water the need is to tap ground-water, which, it is thought, must be reasonably abundant. Water is locally obtained in the dry season by boring in the river beds, and small earth dams are common in the east; good supplies are tapped in the Lobatsi and other districts, but drilling elsewhere has not always been successful. Nearly all the million cattle are in African hands, and a significant trade in stock, carried by the railway to the Union and the Copper Belt, has long been carried on. To promote a meat trade, a 'holding' ranch for stock has been established at Lobatsi, where a big abattoir slaughters stock to be railed in refrigerated trucks to their markets. An experimental scheme is planned in the Ghanzi district to develop African cattle farms on a partnership basis, the Administration making the land available, fencing it, and providing water and other services. Projects of this kind need road and other development, and the long distances involved in the economically poor territory are a great handicap.

There is little known mineral wealth. Small amounts of gold and kyanite are obtained in the Tati concession, near Francistown, and a valuable asbestos mine is operating in the Kanye district.

Copper and gold are known to exist in the Bamangwato reserve, but there is no production.

The settlements along the railway are very small. The larger African settlements are essentially sprawling villages; Kanye, the largest, has 20,000 people; Serowe, the headquarters of the Bamangwato people, has 16,000. The trade is not large, and imports are mainly textiles, grain (in poor years), machinery, and vehicles. Livestock, mainly cattle, and animal products, chiefly hides and skins, make up 90 per cent. of the exports.

The Protectorate is administered from Mafeking, but there is an Assistant Commissioner at Francistown. The system of local councils is being built up with a Joint Advisory Council of European and African members to work with the Administration. A counter-suggestion to the demand for the territory's integration with the Union is that it might join the Federation of Rhodesia and Nyasaland.

SOUTH-WEST AFRICA

This territory, though nominally still a 'mandate,' is effectively integrated with the Union of South Africa, sending a number of members to the Union Parliament. It covers 318,000 square miles, and surrounds the small *enclave* (430 square miles in area) of Walvis Bay, actually part of the Cape Province of the Union, though now under the South-West Africa administration. The white population is about 68,000; the majority is Afrikaner, but there is a substantial German element. The Africans, including a number of coloured, total about 470,000. Prior to the First World War the German administration was often in conflict with the Africans, whose numbers were greatly reduced, they are now increasing. The aboriginal Bushmen, scattered in the east and north-east, are now few in number; there are Hottentots in the south, while the remaining Africans are Bantu Negroes, including Hereros in the central region, and the Ovambo, the most numerous, and providing the chief labour supply, to the north of the Etosha Pan. The territory includes the 'Caprivi Strip' ceded to Germany in 1893 to give access to the Zambezi, it includes the Chobe Swamp.

Physical Features and Climate. The coast rises rapidly to the

plateau of ancient crystalline rock, of which the great central area exceeds 4000 feet, reaching in places in the Windhoek district to over 6000 feet. This plateau dips gently towards the Kalahari in the east and northward to the Etosha Pan. There are no permanent streams apart from the bordering rivers Kunene, Okavango, and Orange, owing to the limited rainfall and relatively high temperature. The bulk of the area lies north of the Tropic

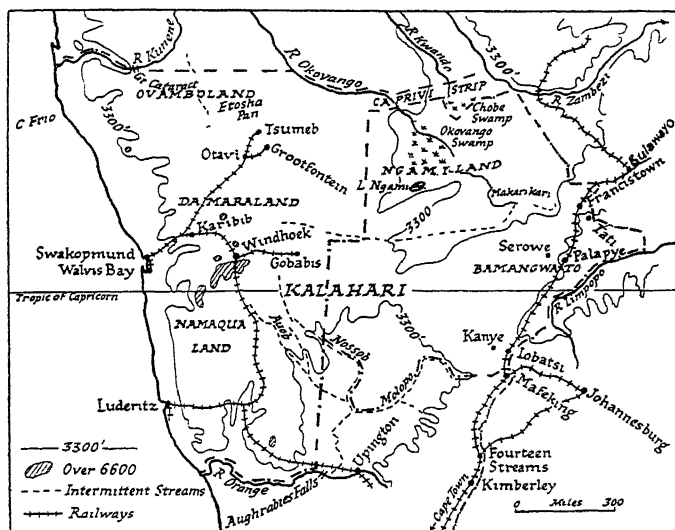


FIG 155. BECHUANALAND PROTECTORATE AND SOUTH-WEST AFRICA

of Capricorn, but the Benguela Current keeps the coast comparatively cool and bracing, and in the interior temperatures are considerably modified by elevation. Nights are nearly everywhere always cool, owing to great radiation through a usually clear and dry atmosphere. The rainfall increases eastward to the plateau, decreasing beyond into the Kalahari. It is heaviest in the north, about 20", and lessens gradually southward to about 5" in the neighbourhood of the Orange River, the least rainfall is in the Namib, where Walvis Bay averages less than $\frac{1}{2}$ ". Except for the

south, which gets a trifling winter rain, the wet season is the summer.

TOWN	HIGHEST MEAN MONTHLY TEMPERATURE	LOWEST MEAN MONTHLY TEMPERATURE	ANNUAL RAINFALL
Swakopmund Windhoek (5463 feet)	63 5° F 75° F.	55° F 55° F	0 7" 13 6"

The Namib is a desert, with no vegetation for about 20 miles inland from the coast; then cacti and euphorbia are found. Namaqualand has a very poor vegetation cover, similar to that of the Karoo, though it grows good grass on the seasonal rainfall. Another barren region is a karst area with underground drainage just south of the Etosha Pan. The rest of South-West Africa is pasture-land of varying quality, with a good deal of bush country and scattered thorn-trees and acacias along the watercourses, only in the north can it be described as wooded, there the better rainfall leads to a park-land type of country.

Productions It is obviously incorrect to regard South-West Africa as a barren region; it is essentially pastoral, and before the white occupation supported large herds. The settlers are typical pastoralists, and the conditions suit cattle in the central and northern districts, especially in the Gobabis and Grootfontein areas, and sheep and goats in the drier south. Pastoral farming is assisted by the sinking of numerous bore-holes, water now being obtainable in this way in many districts, with specially good supplies along the Auob and Nossob rivers, where a little wheat is grown by flood irrigation. There are some 1,500,000 cattle and 6,000,000 small stock, but it is believed that the land could support many more. The use of underground water permits of dairying being carried on; a trade in cattle and cattle products, including butter, has been built up. The outstanding feature of the sheep-rearing is the large number (over 3½ million) of the Karakul breed, from which 'Astrakhan' pelts, or 'Persian' lambskins, are obtained. Limited cultivation of maize, beans, and potatoes is chiefly carried on in the Grootfontein area. In their reserves the Africans grow kafir corn and raise cattle.

has several canneries, produces fish-meal and fish-oils, and has an interest in sealing.

Trade For a territory of this sub-arid character the trade is substantial. The limited range of production leads to considerable imports of foodstuffs, textiles, machinery, iron and steel goods, motor-vehicles, petroleum products, timber, and miscellaneous manufactured goods. The total value of the mineral exports, to which diamonds make a major contribution, is much greater than that of any other category, but exports of karakul-pelts are large as are those of canned fish and live animals; butter also makes a contribution. Half the imports are derived from the Union, and half the remainder consists of re-exports from that country, which takes most of the live cattle, canned fish, and butter that are exported. The minerals go mainly to the United Kingdom, the U S A, and Belgium.

THE UNION OF SOUTH AFRICA

The following table shows the area and population (census of 1951) of the constituent provinces of the Union, the figures for the Cape Province include those of the small Walvis Bay *enclave*. The total population was almost twice that recorded in 1921.

—	CAPE PROVINCE	NATAL	TRANSVAAL	ORANGE FREE STATE	TOTAL
Area (square miles)	277,113	35,284	110,450	49,838	472,685
Europeans	936,109	274,240	1,204,712	277,652	2,642,713
Bantus	2,483,652	1,803,347	3,472,640	775,702	8,535,341
Asiatics	17,818	299,491	49,342	13	366,664
Coloured	982,191	31,485	75,014	14,715	1,103,405
Total	4,419,770	2,408,563	4,801,708	1,018,082	12,648,123

Estimate, 1958: Europeans, 3,011,000; Bantus, 9,606,000; Asiatics, 441,000; Coloured, 1,360,000; Total, 14,418,000.

The Europeans are mainly of Dutch and British origin; it is

not possible to be precise as to the relative proportions, but the 1951 census showed that some 57 per cent. used Afrikaans as their 'home' language and some 39 per cent. used English. English-speaking Europeans predominate in Natal and possibly in the Cape Province, while there is a very large English-speaking section in the Rand area; elsewhere Afrikaners form the vast majority.

The bulk of the population is in the east and south; a rough division between the sparsely populated and relatively well-populated areas is provided by the 20" annual isohyet. On the wetter side of this line is the bulk of the Union's cultivation, on the other side dry pastoral conditions prevail. The Southern Transvaal shows the Union's greatest concentration is the Pretoria-Rand-Vereeniging area, where nearly one-fifth of the total population lives on one per cent of the area. Other important concentrations centre on Cape Town and Durban, with smaller ones round other ports and certain interior centres. Otherwise the densest population is in the 'Native areas,' especially those in the east of the Cape Province, in parts of Natal and the northern Transvaal; in these areas the male proportion is notably low as many of the younger men have sought work elsewhere.

Among the provinces, the Transvaal has shown the greatest advance in population since the 1946 census, due mainly to industrial expansion in the south but also to agricultural and other development in the east. The increase of population in the Orange Free State, where in the south population is declining, has been due mainly to the development of the goldfield round the growing centres of Welkom and Odendaalsrus.

Urbanization is proceeding apace; there were in 1951 seventeen towns with over 60,000 inhabitants, and these had a total of 3½ million people, of whom nearly 1,400,000 were Europeans—more than half the white population of the Union. The census showed that Asiatics had the greatest rate of increase, coloured (of mixed blood) the next, and Africans—usually referred to as natives or Bantus—the lowest of the four. That the Africans showed a lower rate of increase than the other races may be largely attributed to the influx of Africans into the towns, with consequent abnormal home conditions. The census also showed that 43 per cent of the Africans were in the 'Native areas,' 30 per cent. on

European farms, and 27 per cent in European urban areas. The percentage in the last group has rapidly grown. It may be noted that 78 per cent. of the Europeans are classified as urban.

Restrictions on non-Europeans have long obtained in the Union, and particularly under the policy of *apartheid*, which word may roughly be translated as 'separation,' these have increased. A 'colour bar' confining skilled labour to the whites has long been legal, and recently steps have been taken to restrict African settlement outside the reserves and to control African education and industrial activities. There is notable population pressure in the African reserves, which chiefly lie in the eastern parts of the Union. The implication of the term *apartheid* that there might be territorial segregation as between European and African communities seems difficult of realization, for whether on the farms or in the mines and urban centres the European is dependent upon African labour. Hitherto African labour on farms has been largely supplied by 'squatters' who in effect pay rent in the form of labour, but this system is being modified.

The Bantu people are the chief source of labour in most areas, but in Natal Indians, originally introduced for plantation work, are more numerous than the European population. Indian immigration has been prohibited for many years. There are political and other restrictions on Asiatics, who are commonly traders, shopkeepers, market-gardeners, and semi-skilled workers.

The coloured element of mixed white and mainly Hottentot blood is another large source of labour-supply, but, like African labour, it is commonly regarded as inefficient. Officially the term 'coloured' includes non-Negro people (such as the Hottentots) forming about a quarter of the total. The rest are of varying grades of mixture and mostly speak Afrikaans. Nearly 90 per cent. are in the western part of the Cape Province. They form, in effect, a depressed class at a somewhat higher level than that of the Bantu, and provide a good deal of semi-skilled labour and a small number who are in higher ranks of employment. A smaller group of a different character was presented by the 'poor whites,' formerly 'degenerate' Europeans adopting more or less the African standard of life. For various reasons—largely failure in farming in the Cape and loss of old occupations, such as hunting

and ox-wagon transport, in the Transvaal—there were many unskilled whites who from the point of view of employment were regarded as ranking with the coloured, which they resented. Training and work colonies and the alluvial diamond-diggings provided partial remedies but the poor whites have now been mostly absorbed in urban industry.

Taking a long view, the most serious problem concerns the future relations of the white and black races. In many districts there is a migration of rural dwellers to the towns which also receive a steady inflow of Africans from the reserves, where a food-supply inadequate for the population is produced. A poll tax and a hut tax which must be paid in cash provide an incentive for adult males to leave the reserves for the mines, the farms, and the towns. The undermining of the tribal basis of Bantu life and the widespread use of African labour have led to political and economic aspirations the fulfilment of which is not possible under the policy of *apartheid*.

The four constituent provinces retain only a small measure of autonomy since they became united as the Union of South Africa in 1910, with a Governor-General now representing the head of the Commonwealth. It is typical of the existence of the two European elements that the seat of government is Pretoria, in what was the larger of the two Boer republics, while the Union Parliament meets in Cape Town, where British penetration brought about the Great Trek which led to the establishment of these republics. Both English and Afrikaans are official languages; bi-lingualism is common.

Immigration into South Africa is normally not large, and in occasional years has been exceeded by emigration.

Physical Conditions. There is a limited amount of coastal lowland. Forty per cent of the area is high plateau above 4000 feet. About 150 miles inland runs the belt of generally highest land from the Nieuwveld Range to the Drakensberg; but in the south the high ridges bordering the 'steps' down to the coast are an important feature. Many different names are applied to the more outstanding features of the relief. The highest and most rugged country occurs in Basutoland and on the Natal border, where erosion is particularly active in the Quathlamba Mountains,

but these mountains (part of the Drakensberg system), which are a magnificent rampart from the Natal side, appear to be little more than a row of hills when seen in the distance from the west. The plateau inside this higher eastern rim tilts gently westward.

Detailed knowledge of the geological structure is still incomplete. No fossils older than Devonian are found, so that the

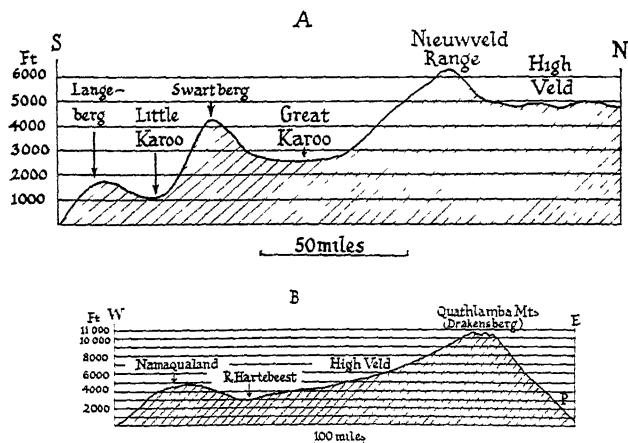


FIG 156. *A* GENERALIZED SECTION NORTH FROM MOSSEL BAY
B GENERALIZED SECTION IN THE LATITUDE OF PIETERMARITZBURG (P)

These sections are drawn on different scales, both horizontal and vertical. *A* illustrates the rimmed steps from the high veld down to the sea, *B* shows the South African plateau and the Drakensberg barrier

precise age and ^{51.6}extent of the Primary rocks can only be estimated. The nomenclature applied to the strata in South Africa is therefore a local one (It may roughly be said that the greater part of the area is covered with the beds of the Karoo system, composed mostly of relatively soft clays, shales, sandstones, and limestones, laid down under mainly continental conditions between late Carboniferous and early Jurassic times.) It is interesting to note that the lowest bed of this system is of glacial origin, above this in the Eccra beds are the chief coal-bearing formations. There are many flat-topped koppies caused by erosion in the generally

horizontal formations, while numerous dolerite intrusions lead to other prominent surface features. 'An enormous area of volcanic rocks occurs in the Quathlamba Mountains.'

This great area of the Karoo system is bordered in the east and south by older rocks, except where it reaches the coast in the neighbourhood of East London. In the south a great area from the Olifants Mountains, curving round parallel with the coast as far as the neighbourhood of Port Elizabeth, is known as the folded Cape system, and consists of older Palæozoic rocks, largely sandstones, conglomerates, and shales, including the Table Mountain Sandstone. This belt of folded mountains is characterized by longitudinal rivers and transverse gorges. Much older are the rocks of the Witwatersrand system of Pre-Cambrian age, found chiefly in the south of the Transvaal, and important on account of the Main Reef group of quartzitic conglomerates—the 'banket' which yields most of the gold. these beds dip steeply southward, hence the deep mining that has to be undertaken. In the north and east of the Transvaal, and extending into Eastern Natal, there appears the ancient crystalline foundation of Africa, and there is another large area of this by the Lower Orange, continuing northward into South-West Africa.'

Geomorphologists distinguish in Southern Africa an interior plateau edged by a broadly continuous erosion scarp, called the Great Escarpment, which is a development of the present erosion cycle.¹ This scarp separates the high interior from the marginal zone, from which it has retreated as erosion has proceeded. It can be traced in Southern Rhodesia; in the Union it can be followed along the Transvaal Drakensberg, where rivers such as the Olifants cut through it in great gorges, along the Natal Drakensberg and Quathlamba Mountains, where the greatest heights, about 11,000 feet, and the most impressive scarp face are found. In the Cape Province it turns westward along the Stormberg, Sneeuwberg, and Nieuwveld Mountains. West of the last, the Great Escarpment turns northward along the Roggeveld Mountains, north of which it comes close to the coast, while north of the Orange it forms the inner margin of the Namib. The Great Escarpment is developed in a variety of formations—

¹ See *South African Scenery*, by L. C. King.

crystalline rocks in the Eastern Transvaal, Karoo beds south of the Buffalo river, black lavas in Natal, Karoo beds in the south, granite in Namaqualand and South-West Africa. The drainage of the interior plateau is mainly the responsibility of the Orange and Limpopo, but the retreat of the escarpment has inevitably involved some capture of drainage (a good example is seen in the Olifants river of the eastern Transvaal) but, in general, the Great Escarpment is also the watershed, and for most of its length of well over 1000 miles in the Union it is a well-marked feature.

Sharply graded rivers, divided up into smooth reaches by rapids, are characteristic of South Africa. Reference has already been made to their summer flood régime and to the way in which the rivers of the east, with their much heavier supply of rain and steeper gradients, are eating into the eastern rim, in some cases having broken through and captured drainage. Rivers with a good supply of water all through the year are found only among the relatively short ones of the south and east, from the Breede to the eastern Transvaal. Both these and the larger ones have a negligible value for navigation, and the deep trenches made by the rivers in the plateau, together with the flood character of the rivers themselves, in general preclude large-scale irrigation schemes.

The Limpopo or Crocodile river, 1000 miles long, rises in the Witwatersrand, and drains the greater part of the Transvaal. Just before reaching the frontier, where the river leaves the Zoutpansberg plateau, are the Tolo Azime Falls. During the dry winter season much of the bed of this river is merely a series of pools. Its chief tributary is the Olifants. Also rising in the Transvaal is the Komati, which cuts across political boundaries to reach the sea in Delagoa Bay. The Orange, 1200 miles long, drains the greater part of the region inside the highland area. Like the Vaal, it is a poor river in the winter season, and below the junction of this tributary only occasionally receives water from its 'tributaries,' such as the Molopo and the Hartebeest. In its lower course the Orange loses much water by evaporation, and below Upington runs through a gorge, with a drop of 480 feet over the Aughrabies Falls. In the winter it can be forded near its mouth, which is closed by a sand-bar. All South African rivers

are obstructed by silt, and as sheltered bays are rare, so also are good harbours. A good one, Saldanha Bay, has an arid and sandy hinterland

Climate. From rising relief from the south towards the equator there results such a modification of temperature that there is a remarkable uniformity in the annual mean over a very large part

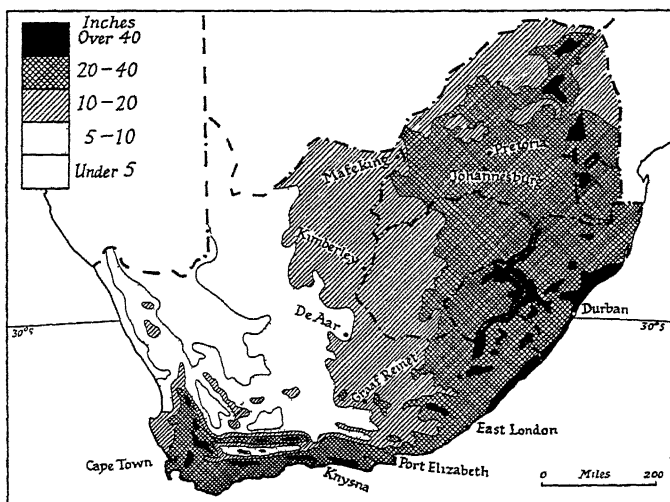


FIG. 157. UNION OF SOUTH AFRICA—MEAN ANNUAL RAINFALL

Based upon an official map

of the Union. Thus the mean annual temperatures of Mossel Bay, Graaff Reinet (2460 feet), Ookiep (3036 feet), and Pretoria (4375 feet) are respectively 63.5° F., 64.5° F., 63° F., and 63.5° F. The effect of ocean currents is illustrated by a comparison of the mean temperatures of Port Nolloth (near which the coldest water is found) and Durban, respectively 57.5° F and 70° F. To these general points must be added the increased annual range of temperature with distance from the sea and altitude, so that whereas Mossel Bay and Durban have annual ranges of only 12° F. those of Kimberley and Pretoria are 26° F. and 21° F.

respectively. A further important factor is the daily range of temperature, which, while small along the coast, is considerable in the interior. The extreme maximum and minimum temperatures recorded in the interior are 125° F. and 6° F. Under anti-cyclonic conditions away from the coast night frosts in winter are

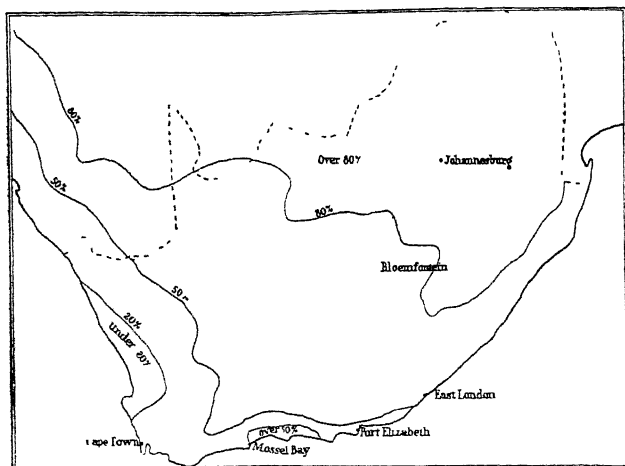


FIG. 158. UNION OF SOUTH AFRICA—PROPORTION OF RAIN FALLING IN THE SUMMER

Based upon an official map

commonly severe enough to freeze standing water, and a very large area of the Union is liable to these for nearly half of the year. A particular consequence is a considerable restriction of the area that can grow cotton.

The figures in the table opposite will repay study both as regards the total amount and the distribution of the rainfall. Note in particular the variations along the coast between Cape Town and Durban.

The following rainfall totals may be found useful: Port St Johns, 50"; Eshowe (Zululand), 58"; M'babane (Swaziland), 54"; Mafeteng (Basutoland), 30"; Rustenburg, 25 5"; Graaff Reinet, 14"; Ookiep, 7".

TABLE ILLUSTRATING THE RAINFALL IN DIFFERENT REGIONS OF THE UNION

PLACE	REGION	ALTITUDE (FEET)	MEAN MONTHLY RAINFALL IN INCHES												
			Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
Cape Town	Mediterranean	40	0.7	0.6	0.9	1.9	3.7	4.4	3.6	3.3	2.3	1.6	1.1	0.8	24.9
Knysna	Warm temperate forest	950	2.0	2.1	2.5	2.2	2.4	2.2	2.1	2.6	3.0	2.6	2.4	2.3	28.4
East London	Grassveld	150	3.0	3.2	3.8	2.6	2.3	1.5	1.6	1.9	3.0	3.5	3.2	3.1	32.7
Durban	Palm belt	260	4.6	5.3	6.0	3.6	2.6	1.8	1.7	1.8	2.8	5.1	4.7	5.2	45.2
Pietermaritzburg	Grassveld	2218	5.6	4.9	5.3	1.9	1.0	0.5	0.5	1.0	1.9	3.4	4.4	5.7	36.1
Johannesburg	High veld	5925	5.2	4.3	3.8	1.5	0.7	0.2	0.4	0.4	0.9	2.4	4.7	4.7	29.2
Oudtshoorn	Karoo	1014	0.5	0.7	1.2	0.9	0.9	0.7	0.6	0.8	1.0	0.8	0.8	0.6	9.5
Calvinia	Semi-desert	3500	0.3	0.5	0.8	0.8	1.1	1.2	1.0	0.9	0.6	0.5	0.4	0.2	8.3
Port Nolloth	Namaqualand	16	0.1	0.1	0.2	0.2	0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.1	2.5

The general variations in the amount and distribution of the rainfall are indicated in the table. The heaviest rainfall, exceeding 40", is found in a coastal strip in the neighbourhood of Durban and on much of the high eastern rim of the plateau, though

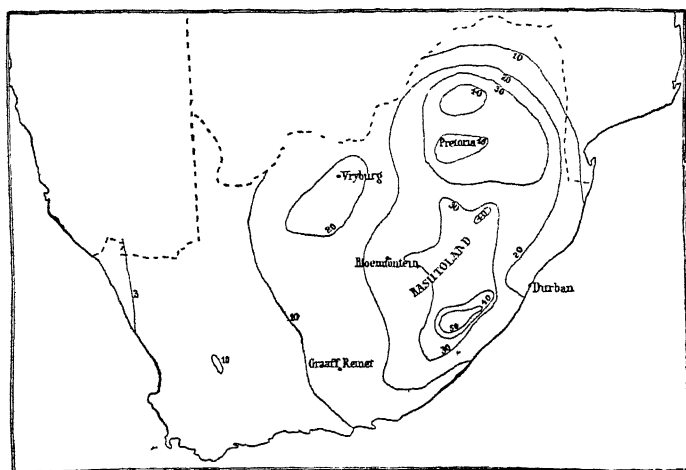


FIG. 159 UNION OF SOUTH AFRICA—MEAN ANNUAL NUMBER OF THUNDERSTORMS

The largest numbers are associated with the Drakensberg and the high veld

Based upon an official map

locally, owing to relief and exposure, there may be much heavier totals, as on the Drakenstein Mountains, where 70" is probably exceeded. On the map of annual isohyets the 20" line is the most important, as broadly demarcating the agricultural from the mainly pastoral zone and bringing out the importance of the north-to-south ridge of the Olifants Mountains in increasing the rainfall in the Cape Town corner. The map showing the percentage of rain falling in summer is very illuminating in distinguishing the area of Mediterranean character in the south-west corner and the eastward continuation of it with a well-distributed rainfall. The prevailing summer rain is due to moist maritime air moving in from the Indian Ocean when the pressure over South Africa

is relatively low. The interior precipitation varies in amount from year to year, and occurs mainly through the agency of thunderstorms, often associated with hail. These are frequently preceded by unpleasant dust-storms. The Johannesburg district has an average of more than forty thunderstorms per annum. Snow, on the other hand, is exceedingly rare, except on the highest elevations. A feature of the climate of the coast-lands and of the foot of the plateau is the occurrence of hot, dry 'Berg winds,' blowing intermittently, chiefly in winter along the west and south coasts, but most commonly in spring elsewhere. They descend from the plateau, and, being warmed by compression, may temporarily with bright sunshine raise the maximum temperature on a winter's day above corresponding summer temperatures. Like Australia, South Africa may be called a land of sunshine. The percentage of the total possible hours of sunshine at Cape Town is 66 and at Johannesburg 73, in London it is 29. Evaporation from water-surfaces is in consequence very great, being everywhere equivalent to more than 60" per annum.

From the point of view of the European, the climatic conditions over the greater part of the area permit genuine settlement without the debilitating effects that seem to occur in elevated regions in lower latitudes. The South African-born whites are generally of good physique, and are able to carry on outdoor occupations without undue discomfort for the greater part of the year. From the farming point of view, there are two serious drawbacks to the rainfall: the first is its unreliability, which affects the quality and yield of crops and stock, the second is its torrential character, which involves the rapid run-off of the much-needed water and the rapid erosion of the surface soil, a destructive factor on many farms. Such rainfall is far less valuable to the agriculturist than are gentle, prolonged falls. Tree-planting and conservation dams are tending to limit the damage due to the nature of the rainfall.

Vegetation. As in other parts of Africa, land use has modified the natural vegetation of the lands of the Union. Forests have been cut, grass-burning has long prevailed and continues to-day, though not so prevalent as formerly. In some cases introduced plants have become almost a pest, as in the case of the jointed

cactus ¹ (Plantations of eucalyptus and acacias are masking the veld in the neighbourhood of Johannesburg, and form now a useful timber-supply for the mines Wattle (acacia) plantations have great economic importance in Natal)

The forest element in the indigenous flora is limited The chief

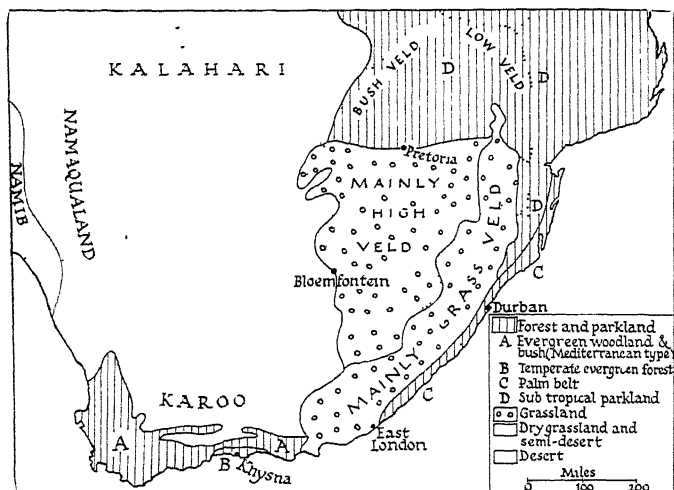


FIG. 160. UNION OF SOUTH AFRICA—VEGETATION

Simplified from an official map

Firing the veld and other human activities have affected the character of the vegetation cover

high forest area is a stretch of country about 100 miles long in the Knysna district, where the rainfall is well distributed through the year, here are found broad-leaved evergreens, including stinkwood (a laurel) as well as yellowwood (a podocarp). Stinkwood yields a durable timber for wagon-building and furniture-making; yellowwood provides a soft but useful timber. These trees, as well as sneezewood (the dust of which gives rise to sneezing) and black ironwood, are found on the slopes and in the gullies of Natal among the relatively dense vegetation of the evergreen palm belt,

¹ The indigenous prickly pear has been a worse pest, it is being controlled by liberating insects, including *Cactoblastus cactorum*, in the infested areas, a method successfully followed in Australia. It has been found that the cochineal insect keeps down the jointed cactus, introduced as an ornamental plant.

and again on the Drakensberg of the Eastern Transvaal. An area towards the north-east with a moderate to substantial summer rainfall is classified as 'park-land'; it is savanna in character, with trees adapted to a drought season and considerable growth of bush and grass. It is characterized by the baobab or cream of tartar tree, as well as 'umbrella' acacias. Often spoken of as 'bush veld,' it includes the 'low veld' by the Limpopo. The Cape scrub of the 'Mediterranean' climatic zone is of the sclerophyllous type, with leathery grey-green leaves; shrubs predominate rather than trees, and numerous low, drought-resisting, but brightly flowering plants are common. Only small patches of forest remain on mountain slopes, the trees include varieties of cypress and cedar. Timber trees have been heavily exploited.

The term 'grassland' may be applied to the vegetation of the greater part of the Union. It covers the grassveld (sometimes called thorn veld), a long grass country with tall, succulent aloes and open acacia-bush adapted to a well-marked dry season, and the high veld or grassland proper, where the high, rolling plains are almost devoid of tree or bush—a real temperate grassland with short grass parched in the dry season. The western part of the high veld, sometimes called the middle veld, has mixed long and short grass as well as scattered acacias. This and the grassveld have often been classified as woodland, this was no doubt their original character, but grass fires and the cutting of the larger timber have much reduced the trees. The Kalahari shows a transition towards the semi-desert type, with grass of the dry wiry kind and growing in tufts, varied with areas of thorn bush, and occasionally with some acacias, giving a park-like aspect to the vegetation. Bulbous and succulent plants appear in this region, and become more prevalent in the semi-desert areas of the Karoo and Namaqualand, where there is only a very scanty vegetation cover.

The Union is primarily a pastoral country of varying value, adapted according to the quality of the grass-land to both cattle and small stock. As regards both stock-rearing and cultivation, nature forces the development into the eastern half and southern coast-lands, and it is not surprising that one of the chief problems regarding stock arises from the lack of natural winter feed. In

connexion with this, transhumance has developed; thus, sheep are moved in the autumn from the high veld over the mountains to the middle levels of Natal and Swaziland.

Development. In 1652 Jan van Riebeeck landed at Cape Town with a hundred followers, and white settlement and cultivation began in this corner, which was inhabited by the Hottentots, with the Bushmen farther inland. The vine, with European cereals and stock, was introduced early, and a further impetus was given to settlement by the arrival, between 1688 and 1690, of a number of French Huguenots, who brought a vigorous strain into the blood of the South African Dutch. Many French names in South Africa testify to this to-day. As in North America, coastal settlements here and farther east, where the British established themselves, were maintained and extended only at the price of constant struggles with the native inhabitants. In the Cape region, which finally became British in 1814, miscegenation went on apace, and the Afrikaans modification of the Dutch language developed. With the Great Trek to what is now the Transvaal (p. 338) the struggle with the native people was intensified; the Boers ultimately settled on the veld, mainly as pastoral farmers, and the two Boer republics were founded. The discovery of diamonds near Kimberley in 1867 brought a rush of settlers and the railway, but a more intense immigration followed the opening of the Rand gold-mines in 1886. Improved communications wrought a revolution in the farming; cultivation expanded, and since the establishment of the Union in 1910 the Government has applied itself to the scientific organization of agriculture. This fact is probably connected with the dominance of the Afrikaans element in the Legislature, the British element is largely concerned with mining and industry. Improvement of stock, control of stock diseases, research and experiment in connexion with the quality and yield of crops, the establishment of new cultivations—these are among the activities that characterize development to-day, and have followed in the wake of mineral exploitation, of developing railways, and of political settlement. Great attention has been paid to increasing the habitability of areas hitherto troubled by the mosquito and the tsetse fly. Through the virtual elimination of malaria and nagana, the Eastern

Transvaal has secured a notable expansion of European population, and North Zululand has become an area in which important development is planned. Another and particularly important aspect of development has been the expansion of secondary industry, actually encouraged by the Government. To-day this form of economic activity makes a greater contribution to the national income than any other; agriculture (including forestry and fishing) ranks second, while mining, despite the vital contribution it has made and is still making to the prosperity of the Union, is third.

Forestry It has been pointed out that the natural forest of the Union has largely disappeared through overcutting and other destructive practices † Apart from a good deal of planting of eucalyptus, notably in the Transvaal, for mine poles, and of wattle, especially in Natal, for the wattle industry, there has been much planting under Government auspices of general-purpose soft wood timber, especially in the Transvaal, the midland area of the Cape, and in Natal; forestry has little significance in the Orange Free State Important industry depends upon both the indigenous and exotic timber; there are many State saw-milling plants, while soft timber now serves pulp, paper and rayon industries.‡ The Union is not yet independent of timber imports.

Water-supply and Irrigation. Many areas the average rainfall of which appears sufficient for the commoner farm crops are found in practice to be semi-arid except in favourable years. Spring and autumn are critical seasons, especially the former, when rivers are commonly lowest in September, and dry, parching winds are the rule Owing to the character of the rainfall and river-system, water-conservation has always been important. It is estimated that only 6 per cent. of the rainfall of the Union is taken by the rivers to the sea, and, while an enormous amount is lost by evaporation, there remain large quantities of underground water Tapping this water are some 60,000 bores. Wells and bore-holes with wind-pumps are common, but storage in the river-valleys is limited by the nature of the river-beds, which are deeply cut in the plateau. Small dams are useful for the stock-breeder, but of limited value for the agriculturist. There are no snow-capped mountains to conserve a natural supply of water, and the

coastal character of most of the rainfall renders it useless for irrigating the plateau. Irrigation schemes are too expensive in South Africa to be applied to any but the best soils, and large areas of alluvial soils hardly exist. The prolonged denudation of Africa has, in fact, resulted in a general barrenness of soil, and it



FIG 161. MOWING LUCERNE, TAUNGS IRRIGATION AREA

Taungs is on the Hartz river in an African reserve, it is about 20 miles north of Fourteen Streams

The State Information Office, Pretoria

has been estimated that only 2 per cent of the gross area of the Union can be classed as good cultivable land. Irrigation is therefore confined to limited areas in river-valleys and of some 2 million acres (estimated) of irrigable land in the Union, some of which would be too costly to irrigate, about half is watered in this way.

The Irrigation Department of the Union Government has been responsible for many schemes, some of which are of the diversion type; but more involve storage. Several are large, but most are small. A disturbing feature connected with these enterprises is the accumulation of silt behind the dams—very

measures. Another relevant factor is the high rate of evaporation; at Lake Mentz the average annual rate of evaporation from a free water surface is 71".

At present more than half the irrigated land is in the Cape Province and nearly one-third in the Transvaal. The largest scheme is associated with the Vaal river—the Vaaldam storage which, besides providing water for the mining area, irrigates a very large area in the Cape Province north of Fourteen Streams (the Vaal-Hartz area). It is proposed to develop further the conservation of water in the Vaal and possibly to divert water into it from the Caledon tributary of the Orange. Another scheme contemplated is the damming of the Orange near Bethulie, and, with the aid of tunnels, diverting water into the Fish and Sundays river basins, where much irrigable land is as yet unusable.

Costly irrigation undertakings represent a large and often unre-munerative expenditure. The land, which is necessarily closely settled, is devoted largely to cereals and fodder crops, lucerne and root crops are grown for cattle and dairying purposes; and there is a good deal of truck-farming, vegetables such as tomatoes finding a ready market. Tobacco is another important interest. Citrus fruits find a local and export market, as do table grapes and wine from the vineyards of the south-west. High-priced irrigated land must be intensively farmed.

Cultivation Farming by Europeans depends on African labour; formerly it depended also on the ox as a draught animal, but today European farming is largely mechanized. The locust is a periodical plague, and has been known to sweep southward as far as Table Bay itself. The standard method of dealing with the pest is to spread bait of maize bran or meal poisoned with an arsenic compound for the insect when in the 'hopper' stage, and the Government spends large sums on this work.

The outstanding crop is maize, the production of which has vastly increased since the beginning of the century. It depends upon summer rain, and its value as a staple crop is seriously affected by the irregular and unreliable rainfall in many districts. Although some is grown on most farms of the Union, as a commercial crop it chiefly comes from the 'maize triangle' in the Transvaal and Orange Free State between Mafeking, Middelburg,

and Bloemfontein, this mainly high-veld area producing two-thirds of the total crop. The production is specially heavy in a belt between Springs and Ermelo. To the north of the 'triangle' there has been a considerable development of maize-growing in the Waterberg district round Nylstroom. The Midlands area of Natal and the eastern part of the Cape Province are also important regions, while nearly one-fifth of the total is grown by Africans in the Transkei, Zululand, and Swaziland. The average yield is low, and is highest in Natal; nevertheless, there is normally a large export, and the dry atmospheric conditions favour a high-quality grain. The Transvaal and the Orange Free State rival one another as regards production, most of the Cape Province is unsuited to the crop. Maize (mealies) is the staple native

food in the Union, and is an important element in the diet of Europeans. An increasing amount is being fed to stock as cattle-rearing develops. It would seem that the yield of maize, as of other crops, could be greatly increased by better cultivation and by the general use of manures, especially phosphates, for the soils of South Africa are mostly very deficient in mineral content.

Winter crops of wheat, oats, barley, and rye are important. Wheat is by far the largest crop of the four, and is grown for the grain, but a large proportion of the oats, barley, and rye provides green-feed for stock. Some three-quarters of the area under these crops is in the Cape Province—mainly in the 'Mediterranean' corner. Wheat is also grown in the Oudtshoorn and Mossel Bay districts of that province and in the Caledon valley of the Orange Free State, where the yield is very variable; a little comes from the Transvaal, and some is grown under irrigation, as in the Brits and Rustenburg districts of that province.

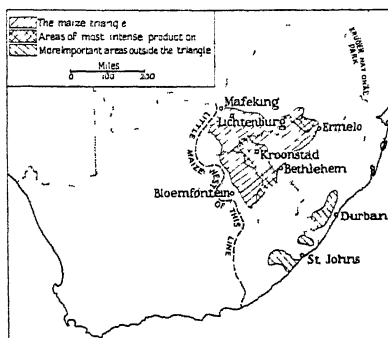


FIG. 163. UNION OF SOUTH AFRICA—CHIEF MAIZE AREAS

The yield is rather low, owing to soil deficiency, and although production has increased, there is normally a substantial import of this grain. Many varieties of millets are grown, the term 'Kafir corn' being strictly applicable to the indigenous sorghum. Millets are, of course, resistant to drought, and Kafir corn is still a staple of the African farming, providing food and fermented drink. Europeans grow only a small acreage of sorghum, chiefly in the drier parts of the Transvaal and the Orange Free State,

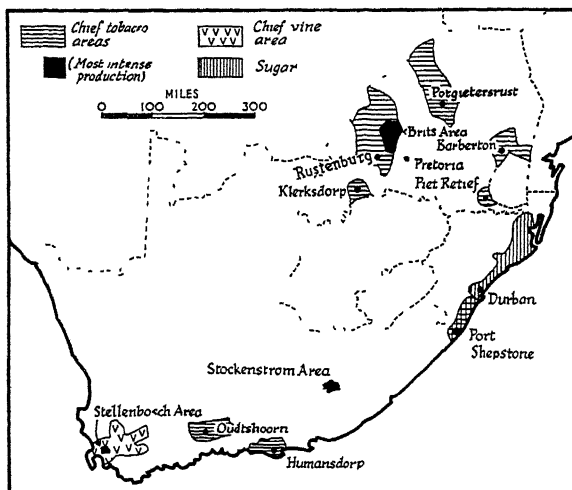


FIG. 164. UNION OF SOUTH AFRICA—
TOBACCO, VINES, AND SUGAR CHIEF AREAS

as a substitute for maize for stock-feeding. Potatoes are a widespread crop (specially important in the Transvaal), as are beans (dried beans find a good market in the Rand mines), while there has been some development of ground-nuts, notably in western districts of the Transvaal where the production is highly mechanized. The foliage of certain beans, including soya, and of ground-nuts is often used as fodder.

Both Virginian and Turkish types of tobacco are grown, mainly the former; it is largely pipe tobacco, though the production

of lighter types has greatly increased/ The Bries and Rustenburg areas of the Transvaal, parts of Natal and the Karoo, and the south-west corner of the Cape Province are among the principal producing areas, the last growing nearly all the Turkish

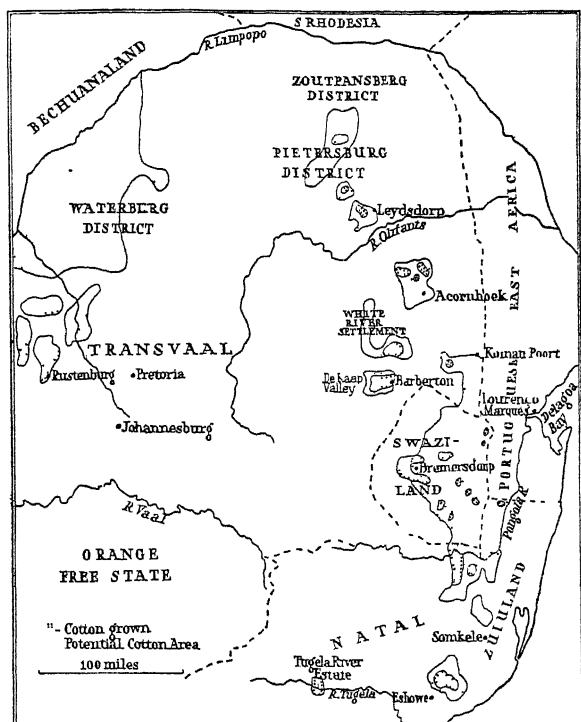


FIG. 165. UNION OF SOUTH AFRICA—RAIN COTTON AREAS

The production is increasing Cotton avoids the high veld

Based upon a map of the Empire Cotton Growing Corporation

type on the winter rainfall In other districts tobacco is usually an irrigation crop ')

Sugar has long been an important crop in the coastal districts of Natal north of Port Shepstone. The palm belt is the chief part

of the Union climatically suited to this crop.¹ Production began in 1853, and Indian labour developed the industry, though it now employs mainly Africans, and there is a surplus for export.² A coastal railway serves this sugar area, which has now spread into Zululand, while a little is grown under irrigation in the Gollel district, by the Pongola river. The breeding of improved canes and the spread of better methods of cultivation have helped to expand this important crop. Tea production once had importance in Natal, but declined and has finally been abandoned. Coffee is another crop that has disappeared.

A good deal of attention has been given to cotton-growing, but the establishment of this industry still presents difficulties. Some is grown in the Rustenburg, Barberton, Zoutpansberg, Waterberg, and Middelburg districts of the Transvaal, in certain districts in Natal, and in the Transkei, but the crop has not yet attained great importance. Production of rain-grown cotton is, however, expanding in the middle and low veld of the Transvaal and Natal. More important is the long-staple cotton grown under irrigation in the Upington district by the Orange river; irrigation cotton is also grown in the Vaal-Hartz area.

A very large increase in citrus-fruit cultivation—particularly the orange—has taken place, stimulated by the fact that Europe is short of supplies in the northern summer. Oranges are cultivated under irrigation, particularly in districts north and east of the high veld in the Transvaal, the valleys of the south-west and south-east areas of the Cape Province, and in the hinterland of Durban. The greatest recent increase has been in the northern and eastern districts of the Transvaal. Grape-fruit production is expanding. Vine-growing has made great strides, the Cape Province growing all this crop, mainly in the south-west corner; it is grown on the rainfall as well as under irrigation, and there is an associated production of wine and dried fruits. Deciduous fruits are mainly grown in this district; they are also being cultivated on the high veld, and an export trade has been built up. It should be mentioned that bananas are extensively grown in Natal and in the low veld of the Transvaal, and the pineapple has been established as an important crop in various districts of the east and south-east.

Stock-rearing. South Africa is naturally a pastoral country, though it must be emphasized that the irregular rainfall is frequently responsible for heavy losses, especially of small stock. There are now some 12 million cattle in the Union, including 5 million in Native hands, partly owned by squatters on European farms, but mainly in the reserves. The highest cattle density is in the better-watered eastern districts of the Union. For draught

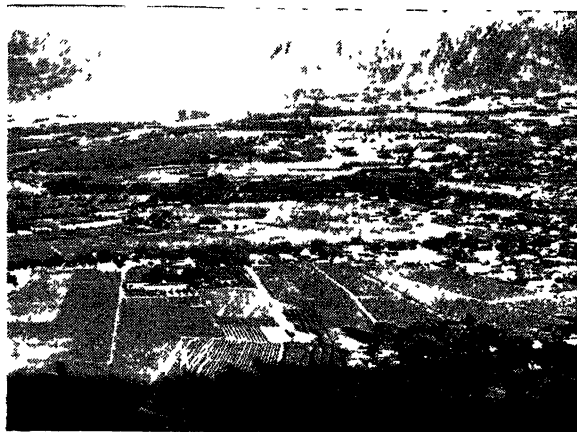


FIG. 166. THE PAARL VALLEY

This was settled by Huguenots towards the end of the seventeenth century, it is now the chief viticultural centre of the Union. In the background is the road to Worcester

The State Information Office, Pretoria

purposes, of limited importance to-day, the hardy native animal is still the basic stock, but for other purposes considerable introductions of European breeds have been made. Cattle diseases are to a large extent under control, and the Union now meets its requirements in beef and dairy produce, and has built up a small export trade in these, there has long been an export of hides. The concentration of cattle is in the regions with more than 20" of rain, and in many districts streams are dammed to preserve summer rainfall for watering the stock. For dairying purposes the high veld, the hinterland of Port Elizabeth and East London, and

the irrigated districts of the Cape Province are most favourable. Maize-growing tends to promote beef production, which has also been helped by the improvement of pastures and the more general growing of fodder crops. A feature of the cattle-rearing of the high veld is the movement of stock in the dry and cold winter to the bush veld (low veld) by the Limpopo, which is unhealthy in summer.

There are some 30 million sheep in the Union, they are mainly woolled sheep, and all but 5 million are on European farms. The Cape sheep is a hardy, fat-tailed animal, but European breeds have been introduced for wool production. Merino stock predominates, for which dry pasture and sunshine are suitable. The annual wool clip is very large, and although the Australian standard of quality has not yet been reached, the conditions in the two regions are very similar in many respects, and South Africa is one of the world's big producers, averaging nearly a quarter of Australia's production of merino wool. In the drier districts the raising of karakul sheep has become important. Water-conservation is an important problem, and on the high veld in the Transvaal the winter conditions are unfavourable. The greatest density of sheep is found in eastern districts of the Cape Province (which has considerably more than half the total), in the southern part of the Orange Free State, and in the region where the Orange Free State, Natal, and the Transvaal meet; transhumance is practised in this last area. Water-storage is an essential feature on the sheep-farms, which are usually very large, if the water problem were solved more sheep could be kept in the drier north-west of the Cape Province, though carrying capacity would remain low. Artesian water has helped in Namaqualand, while underground water in other semi-arid areas is being developed. The sheep density in the drier districts falls below 1 per 10 acres.

The native goat—which has been slightly improved in quality—is of little value except as a local food; it thrives under very dry conditions, and is useful when trained to lead flocks of sheep. The Angora goat has been introduced, and is successfully established, particularly in the Cape Province. Angora goats are not so numerous as other breeds (about 10 per cent. of the total of some 5½ million); the number varies considerably with the rain-

fall, the variation having a corresponding effect upon the export of mohair and goatskins, while low prices for mohair have in recent years led to a great reduction in the number of Angora goats. The Karoos—more particularly the Great Karoo—have the largest numbers. The bulk of the Angora goats are on European farms, which have, however, only one-third of the other goats



FIG. 167. DONKEY TRANSPORT

The hardy and disease-resisting donkey is a useful draught animal.

Union Castle Line

The rearing of pigs has importance, especially in some of the maize-growing districts and in the irrigated areas where lucerne is grown and dairying carried on; the production of bacon has steadily increased. The same is true of poultry-keeping, and egg-production has greatly increased.

The horse was the first domestic animal to be introduced, and to it the European largely owes the establishment and development of his supremacy in South Africa. Horse-breeding is not, however, very important, largely owing to the prevalence of horse-sickness, though modern immunization has much reduced losses from this source. A type known as the 'Cape horse,' which

had a strong Arab strain and was hardy and sure-footed, was developed in earlier times, but has been somewhat modified since then, so that the Arab strain, for example, is not so prominent. The development of motor transport is restricting horse-breeding to-day, but the horse still has importance in the sheep lands and on small holdings, where mechanical power is uneconomical. The donkey, on the other hand, retains its importance, it is more resistant to the tsetse fly, and is immune from horse-sickness. It is stated that a team of twenty donkeys will pull a load of 2 tons about 10 miles a day, and, despite its small size and slowness, it is an economical animal, especially in drier regions. Mules are not numerous, but are valuable, they command a higher price than horses, and are somewhat more resistant to disease. 'Salted' animals, which have recovered from disease, are much more valuable than 'unsalted' ones.

The ostrich was for many years the mainstay of a large number of South African farms in the Cape Province. A number of wild ostriches still exist, but North African ostriches were introduced for breeding, especially in the Little Karoo. But the industry, largely owing to changing fashions, is almost dead, though interest has grown in ostrich pelts. A minor activity, mainly in the Cape Province, is bee-keeping.

Fishing. Of little importance until recent times, this occupation has much expanded, making the South African fisheries the most important in the Southern Hemisphere. Formerly chiefly in the hands of Malays, people of many nationalities now engage in it, including Sicilians and Maltese. For the South African market as well as for export purposes fishing is concentrated at the major ports. Though fish are fairly plentiful in the warmer waters, especially on the shallow Agulhas Bank (running parallel to the coast between Cape Peninsula and Port Elizabeth), they are extraordinarily numerous in the cold waters of the Benguela Current, where cormorants, gannets, and penguins are estimated to consume annually the equivalent of 2 tons of fish per head of the white population of the Union. Important fish include the Cape salmon, the stockfish (hake), snoek (barracouta), maasbanker (horse mackerel), and pilchard; sole is plentiful on the Agulhas Bank. Inshore fisheries include crawfish (rock lobster) which are

canned and exported, and oysters. The catch of pilchard and maasbanker is specially important; there are considerable exports of the canned fish as well as of fish-meal and fish-oil. Modern steam- and motor-fishing vessels, as well as sailing-boats, are utilized.

Whaling companies operate from Durban, both off-shore and in the Antarctic. Whale-oil, whale-manure, and a kind of meal are all obtained, the first being of greatest value, but the production fluctuates considerably. A little sealing has been carried on off the west coast, where penguin eggs are collected from certain island reserves for the Cape Town market. The guano industry of South-West Africa continues along the coast.

Mining. The first mining company was floated in 1863 to work the Namaqualand copper area, and in 1867 the first diamond was discovered. In 1873 the first mined gold was won. The events arising from these discoveries have moulded the history of the Union, and now South Africa is not only the premier producer of gold, as it has been of diamonds, but has developed other important mineral resources of which coal is of special significance, as other mining, industry, and the railways all depend upon it. It is important to mention in regard to the winning of these minerals that only large-scale company production has in general been possible. Big companies, further, are able to a great extent to control output and price—i.e., to stabilize the market for their product. The demand created by mining development for agricultural products and for machinery and stores from overseas, as well as for modern transport development, is a most important factor in the general prosperity of the Union. The railway network, in particular, largely reflects the distribution of important mineral wealth, while the mining industry contributes directly or indirectly a large proportion of the Union revenues.

The dependence of the mining industry upon African labour is illustrated by the fact that the Union gold-mines employ at the present time some 360,000 workers, in the proportion of 1 white to 7 Africans. The former retain the skilled and highly paid work in their hands. It is, broadly speaking, true to say that the high mineral output is possible only because of the cheap unskilled labour available, which is, however, in some respects insufficient

and unsatisfactory and not always easy to recruit in adequate numbers.

Gold The proportion of gold obtained from alluvial fields has been almost negligible, only one such field, in the Lydenburg district of the Transvaal, having proved really remunerative. Reef-mining commenced in the same district in 1873, but extensive development waited upon the Witwatersrand discoveries and the foundation of Johannesburg in 1886. Here the gold exists in fine particles, microscopically crystalline in structure, embedded in the siliceous matrix of a series of ancient conglomerates, known as the Reef series, overlying granite in the Southern Transvaal. The dip of these beds at the surface is sometimes more than 70°, but at a reasonable depth this flattens to one varying between 10° and 30°. Mining is often very deep, and one shaft has been cut to a depth of more than 9000 feet. It is remarkable that the increase of temperature with depth, which averages 1° F. for 65 feet elsewhere in the world, is here only 1° F. for well over 200 feet. At 7103 feet the rock temperature has been found to be 94° F., air-cooling and special airways are needed for working at such great depths. Miner's phthisis, due to dust, was a terrible scourge, but has been considerably reduced.

Much machinery, both on the surface and underground, is necessary for the mines, while the treatment of the 'banket' involves the use of heavy stamps, as well as of chemical processes—notably the amalgamation and cyanide process—for the extraction of the gold. Much plant, operated from power-stations, is utilized, and the relative nearness of coal has been a most important factor in this development. Storages on the Vaal supply the Rand with water.

The gold-bearing reefs are really of low grade, profitable only with large-scale operation. In 1932 the average yield of gold per ton of banket was 6·7 dwt.; in recent years this has fallen to about 4 dwt. An earlier maximum of gold production, stimulated by the world's currency difficulties, was 14 million oz. in 1941; it is now being exceeded as a result of two important developments.

The first of these is the opening up of three new gold areas in the Far West Rand, the Klerksdorp district in the Transvaal and the more important Orange Free State field centring on the rapidly

growing town of Welkom. Nearly a third of the Union's major gold mines belong to the post-Second World War period. These newer areas are not yet fully developed, but by 1960 it is expected that they may expand the total annual production to 20 million oz. The gold yield per ton of the newer mines is much higher than that

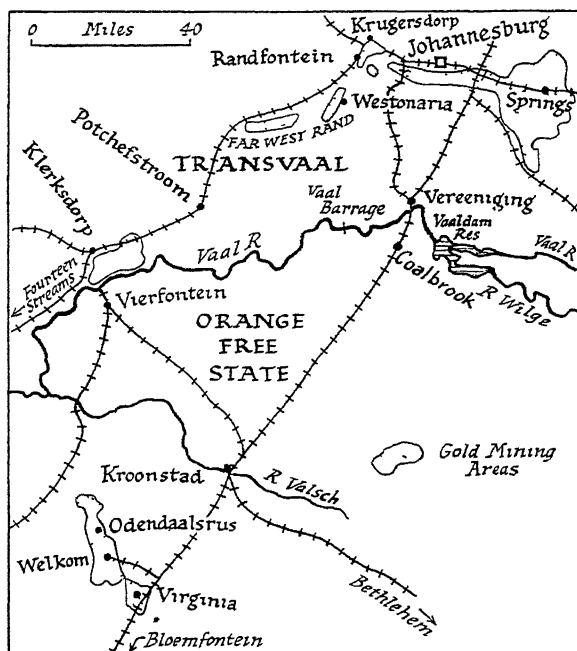


FIG. 168. UNION OF SOUTH AFRICA—GOLDFIELDS

of the older ones; the water-supply problem seems to have been solved, and in the case of the Orange Free State field local coal is available. These new fields (a fourth one is being developed in the Bethal district of the Eastern Transvaal) are planned to provide a much higher standard of social conditions for the mine labour than has obtained in the older areas. The second development has been the modern demand for uranium. Uranium ores occur with much

of the reef gold, and a large number of mines have been authorized to produce uranium oxide from their current production or, in reserve, from their dumps of waste material. The supplementary income from uranium—already considerable—will undoubtedly prolong the life of some low-grade gold producers.

Gold mining has to compete for labour with other mining, including coal, with farming, and with the rapidly expanding secondary industry, accompanied by increasing urbanization. Labour for it is sought far afield and comes from the Rhodesias, Nyasaland, Mozambique, and the High Commission Territories, particularly Basutoland, as well as from reserves within the Union. The employment of Africans shows a distinct decline, offset only partly by increased technical efficiency. The developments outlined above will undoubtedly prolong gold mining in the Union (a wasting asset, as the accessible gold is worked out) and will doubtless raise in the immediate future its present proportion (about half) of the world's gold output (excluding U.S.S.R. production).

Diamonds. The first important diamond-workings were developed in Griqualand West, centring on Kimberley. This diamond district is part of a zone of 'Kimberlite pipes' which has been traced from the west of the Orange Free State to Tanganyika Territory. The diamonds occur in ancient serpentinized volcanic pipes, which on the surface have decomposed into a clayey rock, known as 'yellow ground,' below which is a darker hydrated rock called 'blue ground', at a greater depth a comparatively unmetamorphosed rock is reached, known as 'hardebank.' The extraction of diamonds from all these, chiefly the blue ground, involves the disintegration of the rock and washing, followed by separation of the diamonds by means of petroleum jelly. The hardebank has presented the greatest difficulty. The mines have had a chequered history, not all pipes yield diamonds, and to-day of those that do only a few are producing, centring on Kimberley, Postmasburg, Jagersfontein, Koffiefontein, and Pretoria. Digging from the surface has long since been replaced by underground workings.

Since about 1926 the opening up of extensive alluvial fields, found near the junction of the Vaal and Orange rivers, at

Lichtenburg, between Johannesburg and Mafeking, and in Namaqualand, near Port Nolloth, has been of great importance. Serious competition with the older producing areas developed, especially as large quantities of alluvial diamonds are obtained in South-West Africa, Angola, and the Congo basin, as well as in Sierra Leone, Ghana, and British Guiana. There is evidence that the South African alluvial fields are declining in productivity. The whole production of diamonds in the Union is controlled by the Diamond Corporation in conjunction with the Government. Diamonds vary much in size and quality, the largest have come from the pipes, which also yield a vast number of small and inferior stones. Small stones find a market for industrial uses. The Union has been the leading world producer of diamonds, but lost this position to the former Belgian Congo. On the other hand, the Union produces a far higher proportion of gem stones.

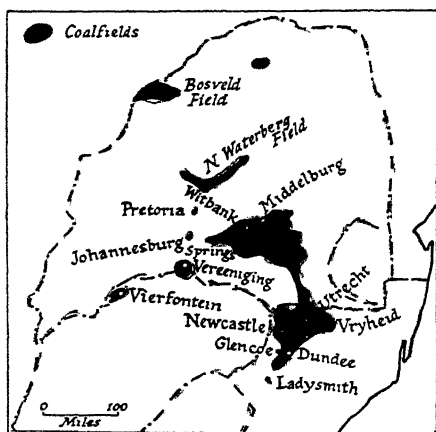


FIG. 169.
UNION OF SOUTH AFRICA—COAL

Coal. Besides possessing much good coal, the Union has useful and cheaply worked resources and great reserves of coal of poorer quality. Coal has been worked in the Stormberg beds of the Cape Province, but its inferior value has led to its being abandoned. In Natal collieries are found in the Vryheid, Utrecht, Newcastle, and Dundee districts; the coal is generally of good quality, and is conveniently situated for export from Durban. The Transvaal production is three to four times that of Natal, its most important collieries are found in the Witbank district, but others of somewhat lower quality are worked in the Middelburg and Ermelo districts, and near Vereeniging. The Rand's development has

largely depended on the Transvaal coal. The Orange Free State has large reserves of rather poor coal, very useful, however, for thermo-generating power stations, and the long proposed railway from Lourenço Marques through Swaziland might open up what is thought to be an important coalfield in that territory. The known reserves of the Union are such that they will last for very many years at the present rate of production. The total annual output is approaching 40 million tons, making it the largest coal-producing country in the Southern Hemisphere.

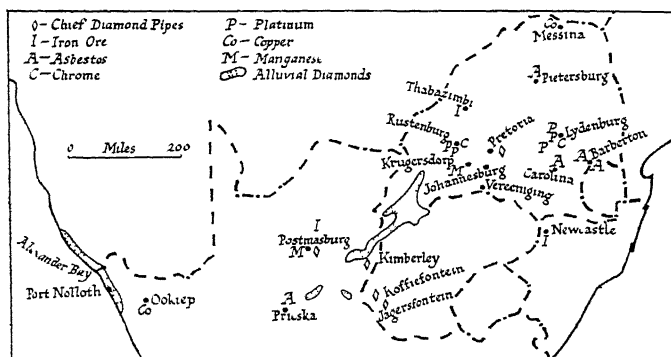


FIG 170. UNION OF SOUTH AFRICA—DISTRIBUTION OF CHIEF MINERALS OTHER THAN GOLD AND COAL

Other Minerals. (Copper production has made an important revival in the Oorlogshoek district, in the north-west of the Cape Province, elsewhere copper is seriously worked only near Messina, in the low veld of the Transvaal.) Tin ore is obtained some 40 miles south-west of Pretoria. High-grade asbestos is worked in the Barberton, Carolina, and Pietersburg districts of the Transvaal, and some comes from north of Prieska, in the Cape Province; the total output is greater than that of Rhodesia. A considerable development of platinum production has taken place from important deposits in the Lydenburg and Rustenburg districts, an important norite reef runs through Rustenburg. These districts have also a considerable production of chrome ore. Iron ore is

plentiful in the Transvaal, it has long been worked in the Newcastle district of Natal, where local coal and limestone are utilized in a smelting industry, but the production here is now much exceeded by that of the Transvaal, which comes chiefly from Thabazimbi. Iron ore is also mined north of Postmasburg, in Griqualand West. A large manganese field has been opened up near Postmasburg, and there are other resources of that mineral in the Krugersdorp district of Natal, west of Johannesburg. Many other minerals of which there is a relatively small production occur in the Union: mention may be made of antimony and phosphates, found in the north east of the Transvaal. It should be noted that a good deal of silver is secured as a by-product of gold and base-metal extraction, and is sent to India. A large amount of salt is obtained by evaporation from interior pans.

Manufacturing Industries. This term covers all kinds of processing, whether of food or raw materials, as well as industry as commonly understood. Factory industry has made very great strides in recent years, developing behind a protective tariff. The lack of sufficient skilled labour to secure the home market in competition with old-established industrial countries remains a handicap, but the two World Wars did much to stimulate industrial production, because they limited the import of manufactured goods, and to-day this production is responsible for nearly a quarter of the annual income of the Union. A corporation—the Industrial Development Corporation—fosters the financing of new enterprises and the extension of old ones, and a sustained expansion of industrialization is contemplated. From the point of view of power-supply, the Rand-Witbank area and the Natal coalfield provide cheap fuel, and the mining development of the former with that of Vereeniging and the Orange Free State goldfield has led to the creation of a group of stations equipped to supply an enormous amount of electricity and compressed air. There is very limited scope for water-power utilization in the Union, largely because the river régime is unsuitable. It is estimated that nearly 300,000 Europeans and a million non-Europeans, mostly Africans, are now employed in secondary industry.

The iron and steel industry, upon which so much other industrial development and constructional work depends, has greatly

expanded. With small beginnings at Newcastle, Vereeniging, and one or two other places, real development came with the opening of the State-sponsored iron and steel works in the west of Pretoria in 1934. Under the same auspices large works now exist near Vereeniging. These modern establishments produce a wide range of finished and semi-finished steel products, including tin-plate.



FIG. 171. SHIRT-MAKING IN AN INDIAN-OWNED FACTORY, NATAL

The State Information Office, Pretoria

The chief areas of industrial concentration are the Southern Transvaal, the Western Cape (Cape Town area), the Durban-Pinetown area, and the Port Elizabeth-Uitenhage area. Another centre of note is East London. The Southern Transvaal is by far the most important, being particularly helped by the local demand arising from the mining development and by easily available coal; moreover, the region includes the iron and steel works referred to above. This region notably concentrates metal and engineering enterprises. Johannesburg is the chief centre, but industry is found at other towns, such as Germiston, Benoni, Brakpan, Springs, and Krugersdorp. Industry in this region is

very varied, including explosives, cement, railway and other engineering, hardware, food, rubber, furniture textiles, and clothing. The Durban-Pinetown area stretches for some miles along the Natal coast, although largely concerned with raw materials, such as sugar, maize, and whaling products, there are factories for furniture, soap, clothing, paper, and chemicals. Cape Town has expanding activities, concerned not only with inland cultivations, notably tobacco and fruit, but including motor-assembly, printing, clothing, furniture, leather goods, and railway engineering. The Port Elizabeth-Uitenhage region is particularly notable for wool-washing and leather industries; Port Elizabeth has factories connected with furniture, tobacco, clothing, leather, tyres, and motor-assembly. The East London area is developing with textile, chemical, and furniture manufactures.

The areas described have in general the largest industrial establishments and account for over 80 per cent. of all persons in secondary industry. Apart from these, Bloemfontein may be noted as growing significantly. There are locally many factories, often small, with varied interests; there has been a great decline in wagon- and harness-making and a corresponding expansion of motor engineering. Textile industries are rapidly developing. Woollen manufacture began long ago with the making of blankets, still important. Since the Second World War, a number of cotton mills has been set up, notably at Ladysmith, Benoni, and near King William's Town.

Among recent industrial enterprises should be noted the large oil-refining plant at Durban, the oil-from-coal enterprise (with associated by-product chemical industries) at Sasolburg, near Coalbrook, a rayon-pulp factory at Umkomaas, 20 miles south of Durban, phosphate production in the low veld of the eastern Transvaal, and a considerable textile project near King William's Town. These substantial enterprises, with the increasingly important iron and steel industry, suggest the determination to pursue the larger forms of industrial development.

Towns and Communications. The railway-system is entirely State-owned. It comprises 14,000 miles of line, including 1460 miles in South-West Africa, mainly of 3' 6" gauge, and has been determined essentially by the existence of interior mining

centres needing connexions with the five outstanding ports: Cape Town, Port Elizabeth, East London, Durban, and Lourenço Marques. The rapid rise from the coast to the plateau is a serious difficulty, and many grading modifications have been made to ease the tracks originally laid down; over 300 miles of line between Durban and the Transvaal border have been electrified to

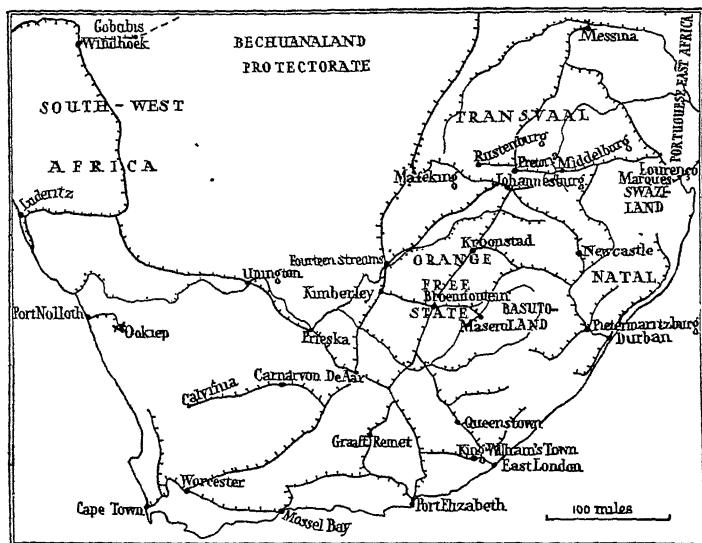


FIG. 172. UNION OF SOUTH AFRICA—PRINCIPAL RAILWAYS

deal safely with heavy traffic and steep gradients. The section from Cape Town on to the plateau has also been electrified.

As the map shows, two roughly parallel main lines run inland from Cape Town and Port Elizabeth. From Cape Town the so-called 'Cape to Cairo' route takes a devious course on to the plateau, and then trends north-north-east through De Aar Junction, Kimberley, and Mafeking to Bulawayo and beyond. The line from Port Elizabeth passes through Bloemfontein and Pretoria to Messina; it is continued to cross the Limpopo at Beitbridge. There are important connexions between these,

With regard to the bulk of goods landed and shipped, Durban handles far more than Cape Town, for it deals with bulkier products, although more ships with a greater total tonnage normally call annually at Cape Town than at Durban

The Transvaal

The Transvaal lies between the Vaal and the Limpopo, and is built chiefly of plateau over 4000 feet in height, with large areas in the south and east above 5000 feet, including the Witwatersrand. The Steentampsberg and the Transvaal Drakensberg much exceed the latter height and may be regarded as the most northerly extension of the Natal Drakensberg. The southern part of the province is therefore mainly high veld. The low veld (roughly below 3000 feet) lies by the Limpopo in the north and along the frontier of Portuguese East Africa. The middle veld is the name applied to the steps or 'banke' by which the high veld falls to lower elevations. The rainfall is heaviest towards the east, and is least by the Limpopo. There is little surface-water, but water-holes and springs are common. Although mainly a grass-land, and naturally a stock-rearing area, there is a tendency to forest in the high east, while the banke are often relatively well-watered, but mostly too steep for cultivation. The low or bush veld has been rendered much less unhealthy than formerly for farming purposes, though the higher land of the Soutpansberg district in the north remains less healthy than the high veld to the south. The Transvaal does not lead in any branch of agricultural production except citrus, though rivalling the Orange Free State in maize (a high veld crop), but its mineral resources have determined the course of the modern communications and economic development of the Union as a whole.

Johannesburg (nearly a million people, with 380,000 whites) may be regarded as the centre of the Rand mining and industrial area. It began in 1886 with a few shanties on a bleak upland of insignificant agricultural value. To-day it is a modern, well-laid-out city, extraordinarily cosmopolitan in character, in the middle of a largely urbanized zone, extending from beyond Krugersdorp in the west to Springs in the east and containing one-eighth of

the total Union population, including nearly a quarter of the Europeans, this zone—the Rand—includes such old-established gold-mining centres as Boksburg, Benoni, Brakpan, and Springs. The mines and the large local market have led to a great deal of secondary industry, largely established in Johannesburg, in addition to which the city is an important educational centre, with the Witwatersrand University. Power and water supplies are vital



FIG 173 MINE-DUMPS AT JOHANNESBURG

With the skyscrapers of the city in the background

The State Information Office, Pretoria

services; the Vaal is a principal source for the latter. About 15 miles north-east of the city is a modern airport, the chief one of the Union. Johannesburg has important railway connexions through Germiston (population 170,000), to the east, where there are factories associated with gold-refining, milling, explosives, engineering, soap, cement, and cotton-ginning. A little farther along the line from Johannesburg to its nearest port, Lourenço Marques, 390 miles distant, are the mining centres of Brakpan and Springs. Farther on is the important Witbank-Middelburg area, where are situated the Transvaal's most productive collieries,

these have an annual output of some 10,000,000 tons, some of which is turned into coke and some exported *via* Lourenço Marques, reached through Komati Poort. There are railway links with Lydenburg, where platinum is exploited, with Barberton, an old gold and asbestos centre, now growing cotton and citrus fruits; with Carolina, where coal and asbestos are worked, with Bethal, in a rich maize area, with Ermelo, in a coal-mining area;

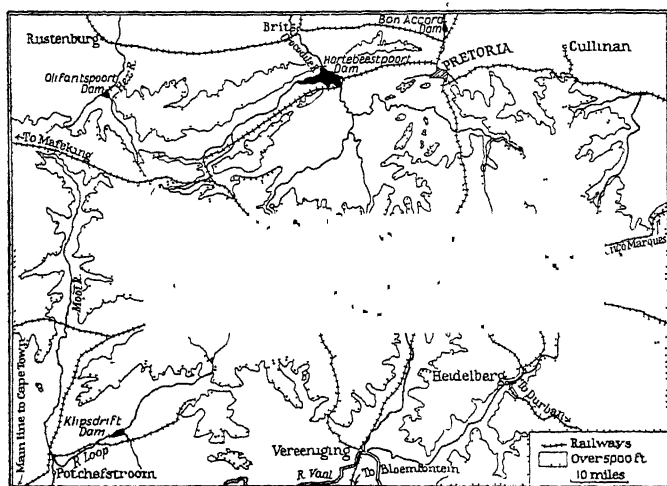


FIG. 174. THE WITWATERSRAND

Note the important junction Germiston. The map shows several storages for irrigation. In addition, on the Vaal 18 miles above Vereeniging is the Vaaldam storage, providing water for the Vaal-Hartz irrigation scheme near Fourteen Springs as well as water for the Rand industrial region, which also is supplied from the great Vaal Barrage, 19 miles below Vereeniging.

and with Piet Retief, an important centre for tobacco and stock-rearing. A railway from Natal runs roughly northward to link Piet Retief, Ermelo, and Carolina to the line running to Lourenço Marques.

The line to Durban, 480 miles distant, passes through the fine pastoral and agricultural country round Heidelberg and Standerton, a region important for maize and oats, as well as for cattle, sheep, and horses; dairying is another local activity.

Northward from Johannesburg Pretoria (population, with suburbs, 300,000, over 50 per cent of which is white) is soon reached. The seat of government of the Transvaal and the Union, this is a university city and the centre of a fertile region with several irrigation schemes, including the Hartebeestpoort Dam. The city lies in a valley sheltered from bleak winter winds. It has owed much to the Premier Diamond Mine 25 miles away. Apart from the market-gardening and tobacco-farming for which the district is important, the large State iron- and steel-works is established in the west of the city. Railway-repair shops and



FIG. 175. CITRUS-FARMS IN THE RUSTENBURG AREA

Showing established groves on the left and newly planted ones on the right

State Information Office, Pretoria

cement works are among the industries. Beyond, the railway reaches Nylstroom, situated in the maize-growing district of the fertile Springbok Flats, and Pietersburg, an important centre for dairy-farming, in a region not only rearing many cattle, but growing cotton, tobacco, and ground-nuts, asbestos is worked in the district. The line goes on through the Soutpansberg country to Messina, by the Limpopo, with important copper-mines and smelting-works, the river is bridged here for the railway. From Pretoria a branch line goes west to Brits and Rustenburg; these irrigation districts are among the most important agricultural areas in the Union, Brits being specially noted for tobacco, while

in the Rustenburg area citrus fruits are grown and cotton seems to be well established, and platinum, nickel, and chrome ore are worked; thence north to the Crocodile river, just beyond which are the Thabazimbi iron-ore deposits, which supply the Pretoria ironworks

Several railways lead west and south-west from Johannesburg. One goes to Zeerust, an irrigation centre growing citrus, wheat, and cotton in a district with some mineral resources, including lead. Another goes to Lichtenburg, which, with Bloemhof farther south, has been important for alluvial diamonds. The line to Bloemhof is the main line to Cape Town, it serves the Far West Rand goldfield and goes on to Potchefstroom, an old settlement, dating from 1839, on the Mooi river, where irrigation has led to important agricultural and dairying occupations, based on lucerne, maize, and Kafir corn. It goes on to Klerksdorp, rapidly growing as the centre of a developing goldfield and important for the maize and cattle raised in the district.

The main line to Bloemfontein reaches the Vaal at Vereeniging (60,000 people), which has near by the important Vanderbijl iron and steel works. The local output of coal is considerable but the works largely use better coal from elsewhere. Vereeniging is rapidly growing as an industrial centre, engineering is important

The Orange Free State

This lies between the Orange and the Vaal, except for a small area in the west, it is entirely over 4000 feet and largely high veld. The eastern boundary is marked by the Drakensberg and the Basutoland border, along which the Caledon flows for a considerable distance. Other rivers have little importance, although the Riet is used for irrigation to the south of Bloemfontein. The rainfall decreases westward, and the eastern districts are therefore more favourable for cultivation, the Caledon valley in the neighbourhood of Ficksburg being called "the granary of South Africa." Wheat is very important in this area, and oats, rye, potatoes, and deciduous fruits are widely cultivated. The 'maize triangle' projects into the northern part of the province, which contains some of the Union's chief maize-growing districts. But the

Orange Free State is mainly pastoral in character, sheep in particular being extensively reared

Minerals, apart from diamonds, have hitherto been of little importance in this province. The recent development of the goldfield in the north-west has therefore considerable significance; and the mining and industrial area that is rapidly growing round Welkom and Odendalsrus, adjacent to the main line through Bloemfontein, will add greatly to the resources of a mainly farming province, in which the settlements are, broadly speaking, on a more modest scale than those in the Transvaal. Coal is now important in the Coalbrook district where the Sasolburg plant is located, it is also found near the goldfield area. The capital is Bloemfontein (115,000 inhabitants, nearly half white), which began as a village centre for the 'voortrekkers'. It lies at 4500 feet, and is a residential and educational centre, with milling and engineering industries, in the middle of a pastoral country rearing sheep, goats, and cattle, and containing several irrigation enterprises. The railway into the Transvaal passes through Glen, the centre of the Bloemfontein River Settlements, with some small irrigation development, and reaches Kroonstad, a railway-junction in a rich maize and pastoral area. From Kroonstad a branch runs eastward to Bethlehem, with railway-workshops and grain-elevators, a junction for the important maize and pastoral centre of Frankfort, on the Wilge river, which supplies most of the water for the great Vaaldam storage. This place and Heilbron, to the west, are in one of the most productive maize districts of the Union. The line reaches the Natal frontier just beyond Harri-smith, in a healthy, well-watered upland area. This town has a small woollen industry, and is a good centre for the impressive Mont aux Sources scenery. Heilbron, Frankfort, Bethlehem, and Harri-smith are all situated at well over 5000 feet.

East from Bloemfontein railways give access to Ficksburg and Wepener, important agricultural centres in the Caledon valley, and convenient for trade with Basutoland.

From the Cape Province the main line to Bloemfontein passes through Springfontein, junction for the railway serving the diamond centres of Koffiefontein and Jagersfontein.

Natal

Physically and climatically Natal, the smallest province, has characteristics which give it a unique position in the Union. It has also a remarkable history, including British settlement, Boer penetration, the breaking of the Zulu power, the trek of many Dutch settlers in 1848 to the Transvaal to avoid British control, and the complication of the colour problem resulting from the bringing in of indentured Indian labour for plantation work



FIG 176 SORTING WATTLE-BARK IN A PIETERMARITZBURG FACTORY
State Information Office, Pretoria

With an average width of about 150 miles Natal rises from the Indian Ocean to the divide made by the Quathlamba and Drakensberg highlands, where the heavy rainfall and rapid erosion have deeply cut into the highlands and created scenery of rugged magnificence. Numerous rivers dissect the country at right angles to the coast Zululand, also well watered, lies north of the Tugela. The narrow coastal plain, the warmest belt, having a heavy summer rainfall, though no really dry season, has many fertile areas producing crops tropical in character; it may be regarded as finishing at an elevation of 1000 to 1500 feet The midlands, rising to 4000 or 5000 feet, are warm-temperate in

character, and have corresponding products, they have in places a somewhat smaller rainfall than the coast plain (Pietermaritzburg, 36", Durban, 45"), and retain important forest areas, as

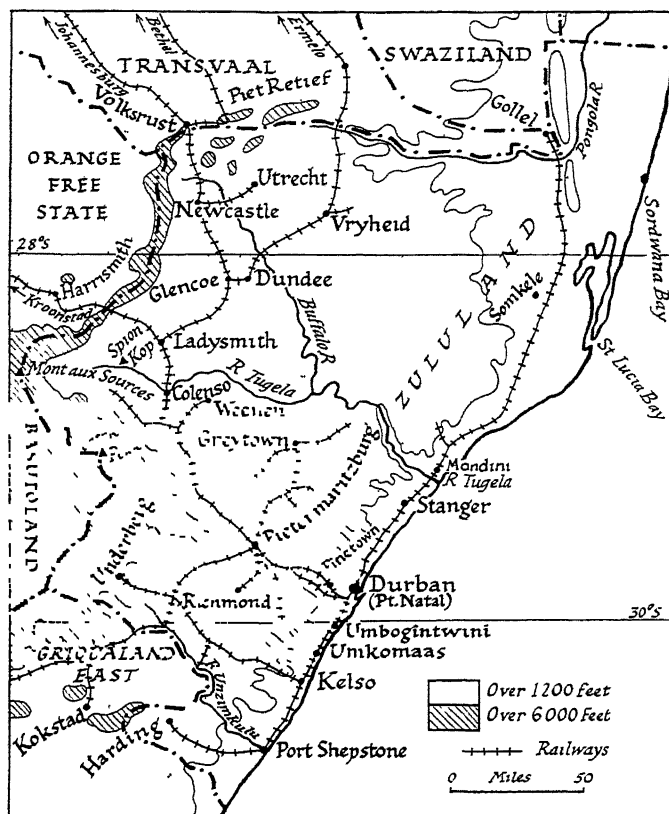


FIG. 177. NATAL

well as being largely planted with wattle, which not only yields tannin extract, but also timber in great demand in the mining districts. Cattle-rearing is more important here than on the coast. The highlands constitute a cool-temperate region, with good

pasture for much of the year—very important to the high-veld farmers. Well-marked steps separate these three main physical divisions of Natal.

Transhumance in Natal is declining. Some movement of cattle from the highlands to the midlands takes place in autumn, but attempts to restrict the incidence of cattle disease and the increasing cultivation of winter fodder are tending to limit this migration. Many sheep still come in the autumn over the Drakensberg to pasture at the eastern foot of the mountains, but increasing fencing of land along the stock routes and measures to prevent the spread of scab have caused a great reduction in the number of flocks moving in this way.

The coast is largely lagoon-fringed, and harbours, with the exception of the much-improved one of Durban, are poor. This city (with suburbs, 480,000 inhabitants, including 152,000 Europeans and even more Indians) lies a little south of the mouth of the Umgeni river on a bay with a narrow entrance, the bar of which has been removed, and very large ships can come alongside the wharves. It was founded in 1824, its immediate hinterland is rich with orchards, growing the orange, banana, pineapple, mango, and other fruits. Its railways bring maize, wool, coal, wattle, sugar, and hides, providing for typical industries, which also include the manufacture of cordage, soap, furniture, and explosives. Durban is also an increasingly popular holiday resort for the Rand, for which area it is a principal port. Besides being well equipped to serve shipping, it has an important oil refinery. In addition to exporting much coal, Durban supplies a good deal to ships for bunkers. The University of Natal is among its important educational facilities. The railway northward runs through the sugar belt, in which banana, cotton, and tobacco cultivation is also carried on. It passes through Stanger (where tea plantations survived until recently), and enters Zululand, where sugar-growing has greatly increased. At Mandini, on the railway just after it crosses the Tugela, a paper-mill makes use of plantation timber. Passing Somkele, the railway goes on to the Pongola river, crossing the narrow projecting strip of the Transvaal to reach Gollel and the Swaziland border. Cattle-rearing in Northern Zululand is no longer hindered by 'fly'; the lowlands

are sparsely inhabited, but two small irrigation schemes—one on the Pongola and the other on a tributary—serve sugar cultivation. The area is thought to be suited to sisal and Mauritius hemp, and afforestation is also contemplated. A new port at Sordwana Bay, to be linked by rail *via* Piet Retief with the Transvaal, has been suggested, as well as a major irrigation scheme on the Pongola.



FIG. 178. ZULU KRAALS

State Information Office, Union of South Africa

The sugar area continues southward from Durban; the railway passes through the industrial belt, marked by Umbogintwini (maize products and fertilizer) and Umkomaas (rayon-pulp), through Kelso, where fibres (varieties of hemp) and cotton are grown, to Port Shepstone, a centre for all typical coastal products, but with a now abandoned harbour

Inland the railway runs through Pinetown, which is essentially an industrial suburb of Durban, to Pietermaritzburg (75,000 inhabitants, nearly half of them white), the capital, situated in wattle-growing and dairying country, its industries include wattle

extract, furniture, confectionery, leather, and brewing. Beyond, the railway runs through an area growing temperate cereals and rearing cattle, passes Colenso, which has the power-station for the electrified railway, and reaches Ladysmith, a junction for the Orange Free State. Northward the coalfield is reached at Glencoe, near which is Dundee, not far from Rorke's Drift, and with small industries. The line goes on to Vryheid, still an important centre for winter sheep-pasture, but also producing much coal and iron ore; it is situated in an important wattle area. The main line for the Transvaal crosses the boundary near Majuba Hill to reach the Transvaal at Volksrust, having passed through the growing industrial centre of Newcastle, with iron-smelting works, as well as timber and dairying occupations. From here a branch runs to the collieries of Utrecht.

The Province of the Cape of Good Hope

The varied relief and climate of the Cape of Good Hope, the largest province, have already been analysed. The good rainfall in the south-west and south is limited to a narrow coastal belt, which, however, considerably widens in the east. The southern zone between the Great Escarpment and the sea is remarkable for the large number of rivers that cut across the Karoos and their bordering ridges; these provide the water for many irrigation schemes, mostly small in character, but of great local importance. The relatively moist conditions of Natal continue into the Transkei Territories, but the Karoos and the whole north-west area, including British Bechuanaland, Great Bushmanland, and Namaqualand, constitute a semi-arid or arid region, dotted with salt-pans, through which runs the Orange River. This dry area is precariously pastoral, and thinly populated, except where local conditions permit of irrigation. It is not surprising that the Cape Province leads in the rearing of sheep and goats; it is also noteworthy that maize is relatively unimportant, but the chief wheat area of the Union is in the south-west of the Cape Province, where the crop is grown with the assistance of the winter rain. Mining activity, too, is not very prominent. The population is densest along the southern margins, especially centring on Cape Town and King William's Town. The rivers are silted along the coast, and there

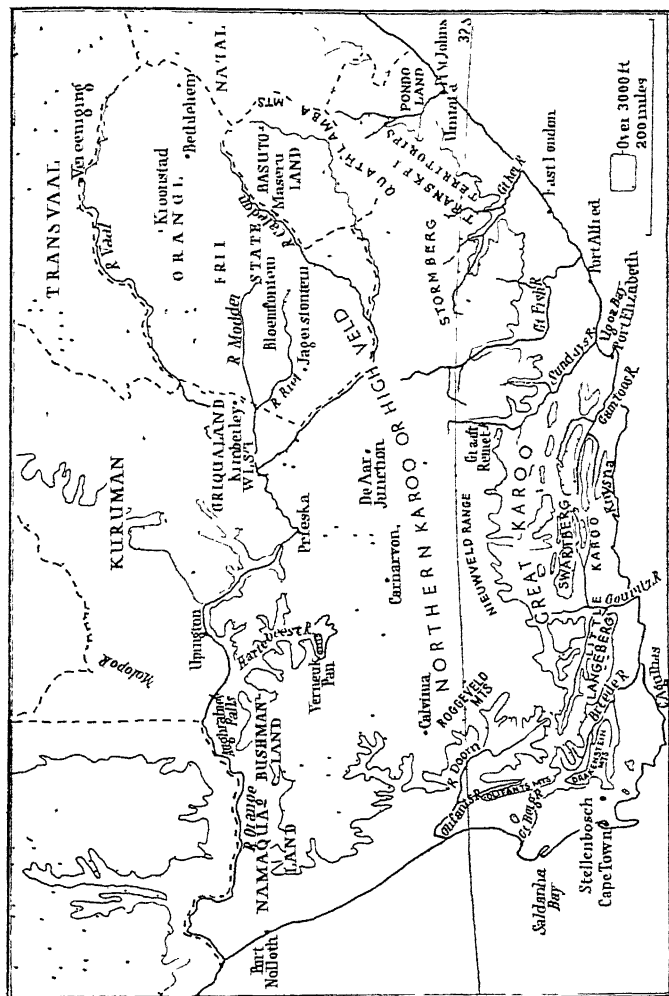


FIG. 179. FEATURES OF THE CAPE PROVINCE

Note the Karoo and the drainage in the south

is no good natural harbour, except the arid Saldanha Bay. Cape Agulhas, the most southerly point of Africa, was the scene of the famous *Birkenhead* wreck, its longitude (20° E.) is recognized as the dividing line between the Atlantic and Indian Oceans.

Cape Town (with a population of 580,000, over 40 per cent. of which is white) began as a watering-place for ships. It owed this not to any excellence in the shelter it provided, but to the fact that it was the first possible place for ships to water after passing the arid coast of South-West Africa. Its hinterland proved eminently suitable for settlement, and subsequently it was found to be relatively easy to penetrate the valleys and the plateau to the north-east. Historically it is the most important city in South Africa.

Table Bay has witnessed many wrecks in the past, shelter is now provided by a breakwater nearly 5000 feet long. Extensive harbour improvements have been carried out, and provision made for all types of shipping; the accommodation includes a fishing harbour. Wharfage is provided with a depth of 36' 6". The beautiful suburbs of the town climb the lower slopes of Table Mountain. The typical products of its hinterland are illustrated by grain-storage and fruit-cooling installations. As the nearest port to Europe, with which the bulk of South African trade is carried on, and served by a trunk-line leading into Central Africa, Cape Town is an important liner and passenger port, a fuelling-station on the route to the Far East and Australia, besides being an outstanding educational centre and pleasure-resort. The Cape Peninsula is a veritable playground, and the growing tourist traffic of South Africa as a whole passes mainly through Cape Town. It has a considerable *entrepôt* trade, and its growing fishing occupation and expanding industries have already been referred to. On False Bay is Simonstown, a naval station, from which the annual mail to Tristan da Cunha, now discontinued, used to be sent.

The agricultural Cape corner is limited by the Olifants river and the Langeberg. Here temperate cereals and fruits, grown both on the winter rainfall and under irrigation—especially grapes and oranges, but including also deciduous varieties—are extensively cultivated. Wine and brandy are made, and preserve-making and fruit-drying and -canning carried on. Important centres are Clanwilliam, Malmesbury, Worcester, Ceres, Robertson, and

Wellington. Of these, which are mostly situated among fine mountain scenery, Worcester is the largest, the district is irrigated from the Hex river and is noted for brandy, wine, and dried fruit,

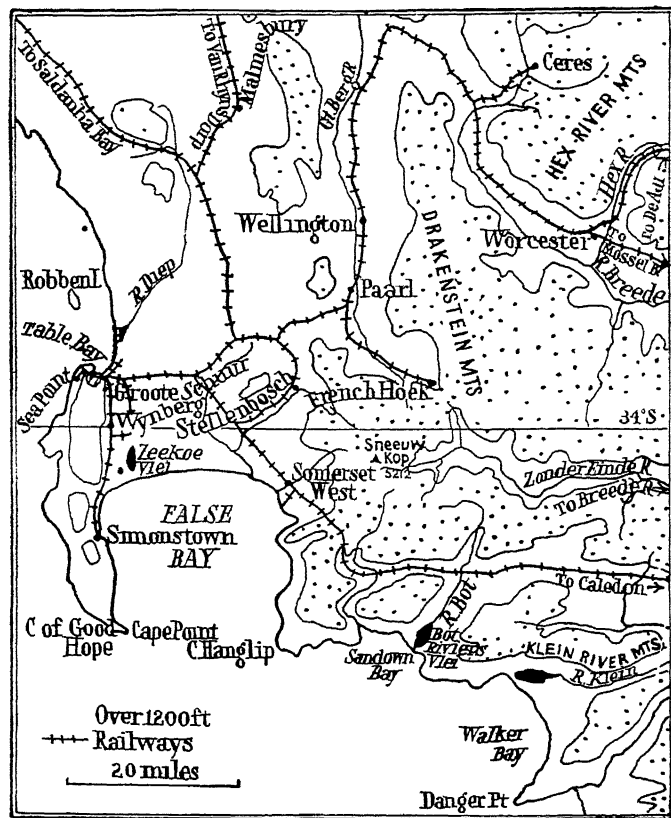


FIG 180. THE IMMEDIATE HINTERLAND OF CAPE TOWN

The main line to De Aar takes a devious route via the Hex valley on to the plateau

especially raisins, Stellenbosch and Paarl are important for tobacco, vines, and fruit grown on the rainfall; the latter has a viticulture research station, and the former, next to Cape Town

the oldest settlement in South Africa, is a university town. Round all these towns pastoral occupations, especially sheep-rearing, are carried on. Somerset West has a large explosives factory, and produces fertilizer and sheep dip, while Caledon is in a district rich in everlasting flowers and Cape heaths. Farther east Swellendam, on the Breede river, is a market for wool, besides being a centre for grain and fruit. Northward from Cape Town a line runs to the neighbourhood of Van Rhynsdorp, a pastoral centre in a region of low rainfall. Large irrigation works have been constructed some distance away on the Olifants river. This line passes through Malmesbury and near Clanwilliam, before reaching the former place it sends a branch to Saldanha Bay.

Within 36 miles of Worcester (794 feet) the main line from Cape Town rises to 3193 feet, in the extreme west of the Great Karoo. This is a dry merino-sheep country, for which Beaufort West, at the foot of the Nieuwveld Range, is the market. Goats and cattle are reared in the high veld, where, at the important railway-junction of De Aar, the lines from Port Elizabeth and from South-West Africa join. The main line goes on to cross the Orange into Griqualand West. Here salt is obtained from pans. The outstanding city of the district is Kimberley (63,000 inhabitants), which was for a time the largest interior settlement. The diamond workings here took the form of deep excavations, but so much rock fell in on the claims that underground mining became necessary. Kimberley is also an important market for cattle. The railway crosses the Vaal at Warrenton, near which is the diversion weir for the Vaal-Hartz irrigation area, then Fourteen Streams, the junction for Johannesburg, and the pastoral centres of Vryburg and Mafeking are reached, the latter being an important railway dépôt, with a cattle trade with the Rand.

Eastward from Cape Town a railway reaches Mossel Bay, a port for the Little Karoo and a resort situated in magnificent country; it has important oyster-fisheries. From here a line reaches Oudtshoorn, on a tributary of the Gouritz, the most important town of the Little Karoo. In this district a considerable acreage is irrigated, and the town is important not only for fruit, grain, brandy, tobacco, and vegetables, but also for dairy products, wool, and mohair.

Between Mossel Bay and Port Elizabeth is Knysna, in a forested region, with furniture industries and a considerable coastal trade in yellow-wood. This is an excellent tourist district. In the forests a small herd of elephants is preserved.

Port Elizabeth (190,000 inhabitants, rather more than 40 per cent. of them white) is the third port of the Union. On Algoa Bay, it has a modern harbour. Its immediate hinterland is the irrigated Sundays River valley and the Great Karoo, but, beyond, the railway gives it access to the high veld and the Orange Free State. Its chief export trade is in grain, wool, and mohair, and it has a large import trade of a general character; it has milling, furniture, tyre-making, motor-assembly, glass, soap, jam, confectionery, and tanning industries. Uitenhage is a large town in an irrigated district just north-west of the port; it has railway-works and wool-washing factories. On the Sundays River is the big Lake Mentz irrigation scheme, which serves the largest citrus area of the Cape Province. The chief town of the Great Karoo is Graaff Reinet, on the Sundays River, an oasis in the arid Karoo, a centre for dairying and fruit as well as for wool and mohair; a few miles above the town is the Van Rhyneveld's Pass irrigation scheme. Northward is the high-veld junction of Middelburg, from which De Aar and Bloemfontein may be reached.

Behind the now disused Port Alfred, in which district pine-apples and oranges are grown, is the important city of Grahamstown, situated at 1770 feet in pastoral country, it is a centre for dairying and sheep rearing, with educational, legal, and ecclesiastical interests and a leather research institute.

East London (population 92,000, nearly half of which is white), at the mouth of the Buffalo, is the next port from the point of view of trade. With a good modern harbour for fairly large vessels, it is the chief wool port of the Union, besides handling a good deal of citrus fruit and dairy produce. It also serves the Transkei Territories, into which area a railway runs to Umtata. East London is also a growing industrial centre, besides being the base for important trawling. Inland is King William's Town, on the Buffalo, the chief centre of a well-populated area in which are many Africans engaged in mealie-growing. Patches of forest containing yellowwood and sneezewood (the latter resistant to the

white ant) remain in the district, in which pastoral occupations are important. The town has a substantial trade with the Transkei and some industry, including wool-washing, furniture, soap, and leather.

Queenstown, farther north, is in a sheep-rearing and wheat-growing area; Molteno was once a colliery town, and Aliwal North, on the Orange, is a market for an area of high veld.



FIG. 181 COTTON LOOMS IN A MODERN MILL NEAR KING WILLIAM'S TOWN

State Information Office, Union of South Africa

From De Aar the railway to South-West Africa runs to Prieska, on the Orange, near which asbestos is worked and alluvial diamonds found, and where oranges and grain are grown with irrigation; it then crosses the river at Upington and continues into South-West Africa. Near Upington the Orange river-flats can be irrigated by channels from the river, and citrus fruits and cotton are cultivated. Some 60 miles to the west the Orange River plunges 480 feet over the Aughrabies Falls, afterwards traversing very poor country

Ookiep, in Namaqualand, grew up on copper-mining until

1918, when the works closed down; production, however, has again become important. The district is only poor pastoral country, and the railway to Port Nolloth from Ookiep was built to serve the mines. Fishing and digging for alluvial diamonds have helped to improve the position of this port.

The pastoral occupations of Kuruman, Gordonia, Bushmanland, and Namaqualand are being assisted by borings to tap underground water. Two important centres, Carnarvon and Calvinia, lie on the southern fringe of the arid region; some irrigation is carried on, and grain is grown, though handicapped by salts which tend to accumulate in the soil. A branch railway from the main line links these two places.

The Transkeian Territories. The Transkeian Territories (Griqualand East, Pondoland, Tembuland, and Transkei) lie between the Kei river and Natal, and cover 16,351 square miles, of which 13,000 square miles consist of African reserves. The population includes about 20,000 whites (chiefly in Griqualand East) and 1½ million Africans, who are increasing considerably; many find employment in the Rand. The whole area is often wrongly called Kafraria, but this name should properly be applied to the immediate hinterland of East London. The territories are for the most part fertile, well-watered upland, very similar to the midlands of Natal. The vegetation is mainly thorn veld, but the palm belt of Natal continues along the coast. The uplands have good grass and present a rolling, almost down-like appearance. In the coast belt Government forestry activities give timber some importance. Cattle and sheep provide the chief occupations, the amount of grain grown sometimes being insufficient for the native needs, though the maize crop is usually heavy. Kokstad, in Griqualand East, is a notable centre of European farming; pastoral occupations, including dairying, have considerable importance.

The Transkeian Territories have a coast lacking in harbours; there is no commercial port. Port St John, in Pondoland, is on a river of the same name, having a small irrigation scheme. Some good cotton is grown in the neighbourhood, which possesses fine scenery and an attractive coast for holiday-makers. East London serves as the main port for the area, though the northern districts,

particularly Griqualand East, are served from Natal. Pondoland is the least touched by white influence. Administered by the Union Minister for Native Affairs, the region has its chief centres, apart from Kokstad, at Butterworth, in the Transkei, and Umtata, in Tembuland, on the railway served by East London. The latter is by far the larger; it is located on the Umtata river that separates



FIG 182. PONDO HUTS

Contrast the shape of these with that of the Zulu huts illustrated on p 427
Union Castle Line

Tembuland from Pondoland, and is the seat of administration of the territories as a whole. Pastoral occupations have great importance round these two settlements.

Trade The trade figures of the Union, which include those of South-West Africa and Swaziland, show a total value far higher than that of any other African political unit; indeed, it may be said that the Union's trade amounts in value to nearly one-fifth of that of the whole continent. That this is largely due to the mineral production, now enhanced by uranium, is clear, especially as gold accounts for some 40 per cent. of the total value of the Union's exports. Mining is responsible for heavy demands

for equipment, including transport equipment, besides a big demand for consumer goods, which is greatly increased by the growing urbanization

Food and drink account for a relatively small proportion of the imports, though it may be noted that the Union has no resources in tea, coffee, or rice. A variety of raw materials or simply-processed materials, such as timber and petroleum, is imported, but the major part of the imports is found in a large range of manufactured goods. Despite the expansion of secondary industry, the Union remains a considerable market for textiles and a very large market for machinery of all kinds, including electrical machinery and motor vehicles and parts. There are also substantial imports of such commodities as pottery, glassware, chemicals, leather and rubber goods, and special products such as electronic goods and wireless sets. The values in any particular category vary, of course, from year to year, and this is specially true of many important export items, such as maize (of which there is a very variable production), diamonds (for which there is a very variable demand), and wool (of which this is normally a large export, though the price realized fluctuates considerably). Of the agricultural production, fresh fruit—notably citrus—makes a substantial export contribution, but there is normally no large sugar surplus available. Hides and skins form a considerable item, while the value of wattle-bark and extract, of which the Union is the chief world producer, is very large. The mineral production, with the principal exceptions of iron ore and coal, is mainly exported; apart from minerals already mentioned, platinum, copper, chrome, manganese, and asbestos are important.

The Union trade is mainly with industrial countries. The United Kingdom is the chief supplier and customer, sending up to 35 per cent. of the imports by value and receiving (apart from gold bullion) a rather smaller proportion of the exports. The United States is a considerable supplier of machinery and a market for certain minerals. Canada, the countries of Western Europe, India, Pakistan, and Japan all have a significant trade with the Union. The Rhodesias provide an important market, as well as taking the greater part of the Union's considerable re-export trade.

The following figures, averaged for some recent years, illustrate the different hinterlands served by Cape Town and Durban.

SHIPPING TONNAGE AND GOODS HANDLED

PORT	TONNAGE LANDED	TONNAGE SHIPPED
Cape Town	2,184,903	978,661
Durban	2,761,506	3,061,585

SWAZILAND

This High Commission Territory covers 6704 square miles, and has a population of about 230,000 Africans (related to the Zulus) and 6000 Europeans, very largely Afrikaners. There is an advisory council, in general indirect rule prevails, operating through the local chiefs who are under a paramount chief. The physical features run broadly in north-south belts, on the western border is the continuation of the Natal Drakensberg; this is high veld, ranging from 3500 to over 5000 feet. The middle veld to the east of it averages 2000 feet and drops to the low veld, varying from 500 to 1500 feet in altitude. On the south-eastern border is the Lebombo ridge of volcanic rocks, reaching over 2000 feet in places and having a high, steep escarpment facing west. The drainage is eastward, largely to the Pongola river, river trenches are incised in the Lebombo ridge. The rainfall varies from well over 50" in the west to as little as 20" in the low veld, where drought is sometimes serious. The high veld is a grassland with generally poor soil, while the middle veld—of a thorn-veld character—has fertile valleys; the low veld is of the dry savanna type, somewhat malarial but with fertile soil.

About half the area is in European ownership, though two-thirds of the holdings are on the high veld in the hands of Transvaal landowners, who use them for winter sheep-pastures, a practice that is slowly declining.

Pastoral occupations—raising cattle and sheep—are the mainstay of the territory, though crops are important. The standard of Swazi farming is rather low, though slowly improving; the bulk of the commercial production comes at present from European

farms mainly in the middle veld. The crops include maize, tobacco, cotton, tung, ground-nuts, and beans. The Swazis grow a good deal of Kafir corn and maize, they possess most of the cattle and many goats—the latter have probably contributed to soil erosion. The territory is not always self-sufficient in maize, a staple food.

There has been important development in recent years, particularly in the field of irrigation in the low veld, served by streams from the highlands to the west; a variety of crops—rice, cotton, citrus, pineapples, and bananas—is being cultivated, though nowhere on a large scale. The first stage of an important scheme is operating on the Komati river in the north of the country; this may be developed on the lines of the Gezira scheme of the Sudan, and it is hoped to have 30,000 acres under irrigation. The development has included the clearing by bulldozers and burning off of much land. Rice and citrus are already successfully cultivated, other likely crops are sugar, beans, cotton, tomatoes, ground-nuts, and maize. A ranch is planned for dry-land farming. Another development of interest has been afforestation in the Piggs Peak district, in the extreme north of the territory, to provide for timber resources, while there has been some planting of wattle.

Certain mineral resources are known, but few worked. The outstanding enterprise is the Havelock asbestos mine just inside the border on the road from Mbabane to Barberton in the Transvaal, to which place the mineral is exported by aerial ropeway. A little tin is worked in the neighbourhood of Mbabane.

Mbabane, situated on the high veld, is the administrative centre. The territory has no railway, and there is still much dependence on ox-transport. Swaziland is in customs union with the Union of South Africa, and all exports must pass through that country so that no use is made of the obviously convenient port of Lourenço Marques. Imports are derived mainly from the Union and up to half of the value consist of general merchandise, including groceries, other items are timber, farming implements, machinery, and motor-vehicles. Asbestos now provides the leading export; live cattle provide the chief farming export, followed by small quantities of hides and skins, rice, seed cotton, tung-oil, wattle-bark, tobacco, and tin.

BASUTOLAND

Situated west of the Quathlamba or Drakensberg divide, Basutoland—in which European settlement is in general prohibited—is the third of the High Commission Territories to be considered in this chapter. The territory covers 11,716 square miles and has a population of 639,000 Basutos with 1900 whites, largely traders and officials. In addition there are always large numbers of Basutos (154,782 at the 1956 census) away in the Union. The Orange rises in Mont aux Sources (10,763 feet high), in the angle made by the basalt Maluti and Quathlamba Mountains, parts of a great volcanic mass deeply eroded by the head-streams of the Orange; where the ridges join is much plateau land over 9000 feet. The scenery of this deeply trenched highland has led to the country being called 'the Switzerland of South Africa.' The lowest ground is by the Caledon river which forms the western boundary; some three-fifths of the people live in this zone. Half the area is so high as to be almost uninhabitable, but with increasing population (this is now the most densely populated large area in South Africa) agriculture has spread to higher levels at the expense of grazing, the primitive hoe has been largely displaced by the ox-drawn plough, and soil erosion has become an outstandingly serious problem. The soils of the highland are very fertile, but have suffered from large-scale gully erosion, largely because of overgrazing; important steps have been taken to protect the land, including lowland terracing, contour grass strips, storm drains, and dams in highland districts. The reclamation of eroded land has still to be attempted. In the highland areas grazing control has been necessary. The land is held on a communal basis, and the rainfall (which averages 30" over most of the area) leads generally to high-veld conditions, except in the mountainous districts.

There are some 400,000 cattle, 1½ million sheep, and over 650,000 goats. Sheep normally remain throughout the year at the higher elevations, but cattle move from the lower villages in spring to the summer pastures, situated at up to 9000 feet. Wool and mohair are important commercial products. The bulk of the arable land is in the lowland, where, unfortunately, cattle manure is fuel and

is not returned to the land. Some 12 per cent. of the total area is arable, and two-thirds of this is under maize; the next important crop is sorghum. Wheat, grown on the uplands, and pulses are others. Agricultural standards are slowly rising, and co-operative marketing societies are important in connexion with wool and mohair. Rotational grazing is being encouraged, and mechanized farming units are at work in a number of districts.

There is little prospect of mining or industrial development in Basutoland, although there are vast reserves of water power along the Orange river, unlikely to be developed unless the territory were to be incorporated in the Union, a prospect from which the Basutos are averse. The capital is Maseru (3000 inhabitants, including half the whites in the territory), just east of the Caledon, and reached by a railway across the river from Bloemfontein; Mafeteng lies farther south. Apart from the link just mentioned, there is no railway; a fair road system exists in the lowlands, but elsewhere there are only bridle paths, on which pack-ponies, important in the highlands, are used for transport. A main road has been cut across the highlands from Maseru to the Natal border, and this has greatly facilitated administration; as in Swaziland, there is a paramount chief, and there is now a mainly African Legislative Council. The chief imports are blankets, cotton goods, agricultural implements, hardware, and groceries. The big export (usually three-quarters by value) is wool; mohair ranks next, followed by small values of cattle, hides and skins, sorghum, wheat, and pulses. Maize is often imported, as the local yield of this crop may be insufficient.

THE ISLANDS OF THE SOUTH ATLANTIC

About longitude 15° W. there runs in the South Atlantic Ocean a long ridge, the Dolphin or Mid-Atlantic Ridge, dividing it into an eastern and a western basin. About 8° S. the isolated volcanic peak of Ascension rises from it, and 37° S. is the volcanic Tristan da Cunha group, with Gough Island somewhat farther south. To the east of the ridge, and rising from much deeper water, is St Helena, also volcanic, in latitude 16° S. The fortunes of all these have varied with the changes in ocean transport.

Ascension, discovered in 1501 by the Portuguese, was occupied by Great Britain in 1815, and until 1922, when it was joined to St Helena, was rated as a man-of-war. It is 34 square miles in area, and is made up of a series of extinct volcanic cones, one—Green Mountain—reaching 2800 feet. In the trade-wind belt, it has tropical temperatures, modified by the ocean; the annual range is small. It is practically rainless below 2000 feet. There is little vegetation except on the upper slopes of Green Mountain, the top of which is often shrouded with mist¹. Fruit and vegetables are cultivated on about 10 acres on this mountain-top. The only settlement, on the north-east coast, is Georgetown. Rabbits, goats, and partridges are numerous, and a little guano, deposited by vast numbers of wide-awake terns, which breed there, is collected. Between January and May sea-turtle breed on the sands, providing food and a small export. The island is rarely visited, as landing is difficult, it has about 500 people, largely employed in connexion with the cable-station.

St Helena is a rugged island, with precipitous cliffs, rising to 2700 feet. It was discovered at the same time as Ascension. It was formerly an important victualling-station for ships on the Cape route when ocean transport was by sailing-ship and the Suez route was not available. Its area is 47 square miles, and it has a population of nearly 5000. Though slightly cooler than Ascension, it has a rainfall averaging 35" a year. The island was formerly clothed with redwood and ebony forests, but introduced goats have ruined the vegetation, and rain has washed much soil from the slopes. Domestic animals and many trees and plants have been introduced, and not very successful attempts have been made to find a market for early potatoes. The introduction of phormium (New Zealand flax) has been more profitable. Fibre and tow make up almost all the small exports. There are eight flax-mills, and a small lace-making industry. Jamestown, the port and only settlement, is an important cable-station.

Tristan da Cunha. This little group, another dependency of St Helena, with a total area of 45 square miles, is exceedingly interesting geographically. The highest point on the main island is nearly 7000 feet in elevation, and only a small plateau in the

¹ Compare with the 'tablecloth' of Table Mountain

north-west, about 12 square miles in extent, is habitable. Snow rests on the highest part during nearly all the year, and, although they are in 37° S. latitude, the islands are swept by stormy westerly winds for more than nine months of the year. Thickets of trees stunted by the strong winds were once plentiful, and there is much grassland. Corn used to be grown, but rats introduced from a wreck in 1882 have put an end to this crop. A few cattle and sheep are reared. Some 30 acres are cultivated mainly under potatoes; apple- and peach-trees are grown. Fish are plentiful, and the development of craw-fishing is being attempted from Cape Town. The community at present numbers about 275; the inhabitants are the descendants of a few sailors and soldiers who remained here after the British garrison was withdrawn in 1817, and occasional shipwrecked sailors. A few people of other nationalities also settled during the prosperous period associated with the whaling industry about the middle of last century. The islands have no regular communications, and are rarely visited. The people, shy and unsophisticated, lead a hard and lonely life; they are healthy, but, except for the more vigorous younger ones, refuse to leave. The visit of a ship bringing a small mail is an outstanding event.

Far to the south-east is the uninhabited, ice-clad **Bouvet Island**, in regard to the possession of which Britain waived her claim in favour of Norway in 1938. The Norwegian Government has contemplated a wireless station on it; the Union Government secured permission to establish a meteorological station there but has decided against the project, and may set one up on one of the British **South Sandwich Islands** much farther east.

The Union Government already maintains a meteorological station on **Marion Island**, ceded by Britain to the Union in 1948, in the South Indian Ocean, some 1200 miles south-east of Cape Town, adjacent to which is **Prince Edward Island**. Marion Island has a boggy surface; it is the resort of several species of penguins, including the King Penguin.

CHAPTER XI

CONCLUSION

SOME of the more important problems connected with the development and future of Africa are very different from those associated with other continents which have been colonized or dominated by Europeans. In North America and Australia the Europeans have established themselves with relatively little hindrance from the small indigenous populations; in South America there has been widespread miscegenation, so that over large areas a population of mixed white and native origin forms a very large and important element—so large, in fact, as to be the characteristic feature of the population of a number of South American countries. In Africa, on the other hand, the Europeans have hitherto for the most part formed separate communities with a social and legal position quite distinct from that of the Africans, though this is disappearing as more and more countries cease to be dominated by their white communities. More than a dozen such became independent in 1960, and others will doubtless follow in the next few years. Moreover, in a great part of the continent the numbers of Europeans are relatively insignificant and likely to remain so. Indeed, south of the Sahara the total number of whites is only $3\frac{1}{2}$ millions, and of this total the Union of South Africa alone has some 3 millions. In this same area south of the Sahara there are perhaps 160 million Africans, and, if we ignore the small groups of Arabs, Indians, and others, the future of Africa must be largely bound up with the status and development of the African. This problem is not, perhaps, essentially geographical, but rather a social and administrative one, but it has important relationships with political and economic geography.

From a more strictly geographical standpoint Africa has problems which, if not different in nature from those of other continents, present some distinctive characteristics. In no other continent is access from the coast to the interior in general so

difficult, with the result that transport and communications are still, having regard to the population and resources of Africa, relatively poor. Another set of problems is connected with health and nutrition, over large tracts of Africa disease, often insect-borne, attacks both man and beast, while resistance to disease is frequently lessened by what may in general terms be described as malnutrition. Again, the prevailing simple and even primitive forms of African agriculture are associated with the two major difficulties of locust infestation and soil erosion, which, although by no means confined to Africa, are specially noteworthy

WHITE ADMINISTRATION

From the point of view of the administrator, as well as from that of the larger interests of the African, the impact of European influence has created problems, the acuteness of which, however, varies to some extent with the political conditions. In black Africa two attitudes are discernible towards the African; on the one hand he is regarded as a source of labour in the interests of the whites, and on the other he is encouraged as an independent producer, whether for subsistence or for profit. In general, these trends prevail in varying degrees in the different political divisions, but there is no doubt that the first is a factor that tends to the disintegration of native life and to the breakdown of tribal controls, besides leading to the development of a proletarian class without any roots in its homeland. The latter is a conserving factor, and may even be the instrument of advancement in economic status and social culture. The significance of this is that the form which African society will assume will in all probability be determined largely by the attitude adopted towards the African by the administrations and by the general relations between white and black, life, occupations, and economic activity will all be affected.

The disturbance to Native life is greatest in the Union of South Africa, where, despite the development of special problems connected with the Asiatic and coloured groups (see p. 382) and the maintenance of certain Bantu territories or reserves, the policy of conserving the country primarily in the interests of the large white population is deliberately pursued, and it is here that

the growth of a landless, labouring African population is most obvious. But disturbance is met with even in inter-tropical Africa, where for the most part permanent white settlement has not taken place, and is not likely to take place. Administrative and economic developments alike contribute to this. Nearly all European administrations have introduced direct taxation of the African, taxation which has generally to be paid in cash and not in kind. It takes various forms: sometimes it is a poll tax on adult males, sometimes a hut tax, while among pastoral people especially it may be a cattle tax or a dog tax or both. In the mandated territory of South-West Africa it is a grazing tax plus a dog tax. The French formerly levied a poll tax on all individuals over a certain age. Taxation is usually increased up to a stated maximum on men with more than one wife. The prevailing system of taxation has been built up empirically over many years, for even within the same territory there are differing 'capacities to pay,' while there are many difficult problems connected with migratory labour and methods of collection. The rates of taxation vary considerably—from sums equal to a few shillings a year to the equivalent of thirty shillings or more. But direct taxation of this kind was something novel to the African economy, except perhaps in the Moslemized areas of the Sudan, and has in some instances been imposed only with great difficulty. In times of economic depression great hardship has resulted. It is less true now than formerly that the effect of such taxation was to compel men to seek work (obviously usually in European employment), in order to pay the tax, but in some areas it inevitably operates in this way, and has even been defended on the ground that it does so. Most administrations aim at making their territories self-supporting, and this direct taxation generally provides a significant revenue to this end. It is, however, desirable to notice a tendency to earmark an increasing proportion of the yield of such taxes to social services among the native communities. A striking development of British colonial policy, begun in 1939, has been the guaranteeing by the Government of substantial sums towards the support and development of such services in the colonial territories.

European Administration. The integration of territories under the control of European Powers was marked by the development

of two different attitudes towards the administrative problems involved. The two policies are usually referred to as those of direct rule and indirect rule, and have been typically studied in French controlled areas in the former case and in British colonies and trust territories in the latter. They reflect probably as much the political outlook of French and British people as they do the considered solution of the problem of administering native peoples. British opinion has for many years been steadily moving in the direction of regarding colonial territories as trusteeships and of considering the desirability of conserving what is good in African social organization, and indirect rule is essentially a method of maintaining and developing the traditional forms, village and tribal, that African culture has built up.

Indirect rule, in effect, makes use of the local headman, chief, or paramount chief, supports his position and that of his advisers, and, subject to controls exercised through political officers, encourages the maintenance of what is thought to be best in native law and custom. Duties are given to such authorities—for example, the collection of taxes and the administration of law and justice. In suitable circumstances the authority becomes the vehicle for the carrying out of other duties, such as social services of health and education and the organization and improvement of agriculture and public works. The aim of indirect rule is clearly to bring the African organization into the general governmental system, not to make it an organ merely to carry out the instructions of the administrative authority. It will be realized that indirect rule is not easy to develop among groups in a primitive stage of development—and Africa provides many examples of such—but the system just outlined has, in fact, functioned in all parts of British-administered Africa. It is obvious also that the principles of indirect rule cannot be applied to those living outside tribal areas in urban and farming districts occupied by Europeans.

Nigeria is usually regarded as the classical example of its development, here the system was built up by Sir Frederick (later Lord) Lugard, whose high position as a colonial administrator is generally recognized. He found the basic material ready to hand in the Mahommedanized emirates and head chieftainships of Northern Nigeria, and in 1914 the system developed there was

in large measure extended under the governorship of Sir Donald Cameron to Southern Nigeria, where, on the whole, more varied and looser organizations prevailed. The Kano Emirate became the most outstanding of these local governments, with a budget reading rather like that of a considerable British local authority. At a generally lower level of native organization the system of indirect rule has been successfully applied to Tanganyika Territory, and in greater or lesser degree it was developed in terri-



FIG. 183. MOBILE CINEMA, KENYA

This form of propaganda, combining entertainment and instruction, is being increasingly used in many territories

Central Office of Information

tories that came under the control of the Colonial Office. It should be remembered that, as in the Gambia and Nyasaland, it has frequently been difficult to find suitable local chiefs upon whom the system could be based, but even in these cases it was built up. It is now the practice to recognize what are called 'Native Authorities' as vehicles for local government. The native authority usually is a chief who will be assisted by a council of local people who may be locally chosen or be nominated, but even where no suitable recognized chief is available local district councils are

set up. As a territory progresses, Africans are brought with somewhat restricted legislative powers into the territorial government. Full internal autonomy is the next stage; then the colonial power may abandon its last controls, as with Ghana (1957), Nigeria (1960), and Sierra Leone (1961). The East African territories are passing somewhat rapidly through these stages. It may well be that these new countries will be handicapped for a considerable time by lack of suitably experienced African administrative personnel.

It must not be thought that under the system of *direct rule* the tribal heads are ignored, but their functions are rather to register and carry out instructions or decrees that come directly from the European authorities, and there is little attempt to secure 'the consent of the governed.' Thus the local chiefs become in effect civil servants, and are expected to carry out the road improvements or crop-planting extensions which are allotted to them; their powers of discretion are severely limited. Direct rule in Africa has now largely disappeared, France partially abandoned it in 1956, and, under the great referendum of 1958, gave its territories the option of independence or inclusion as autonomous countries within the French Community. Guinea decided upon independence; the others are now African republics associated with France. Belgium virtually abandoned direct rule in the Belgian Congo early in 1959, by promising the establishment of native local authorities, the opening of the civil service to Africans, and eventual independence. Only in Portuguese and Spanish territories does direct rule survive.

It is now perhaps academic to attempt to assess the relative merits of the two systems. Direct rule, it is argued, is more efficient; things get done more quickly and more thoroughly; in particular, economic development can be rapidly expanded and improvements in health, sanitation, agriculture, and so forth quickly stimulated.¹ It must be remembered that the French colonial administration looked ultimately to the assimilation of the Africans with the French system, and the local traditions and outlook were, therefore, not a primary concern of the official

¹ Both the French and Belgian administrations favoured compulsory cultivation as a means of educating Africans in improved methods and new crops

mind. Indirect rule is criticized for the strong support given by the administration to the conservative element in African society, with its tendency to stereotype customs and practices that ought, in fact, to be subject to change and development. It is further argued that the obligation imposed upon the weaker units are such as to overstrain their powers. On the other hand, however, it is pointed out that indirect rule is essentially government by consent, that it provides training in responsibility and prepares the African for a fuller control of his own destiny, and that, if economic and other development is necessarily slow, it is the more surely based.

In that part of North Africa linked with France, the administering power was concerned with populations at a far higher cultural level than those found south of the Sahara, and, although established forms of rule were in general maintained, much of the administration and development was on somewhat authoritarian lines. The growth of 'nationalist' sentiment and the increasing sensitiveness of the Mohammedan world since the end of the Second World War led to so much unrest that independence, involving only a tenuous association with France, was granted to Tunisia in 1955, and to Morocco in 1956. The ultimate status of Algeria, where the French have made their greatest attempt at 'assimilation' is uncertain. Elsewhere in Africa there is the astonishing contrast between the Union of South Africa, where the policy of racial segregation is being pursued, and those territories in tropical Africa which have secured or are about to secure self-government.

AFRICAN FARMING

African agriculture, as has been pointed out, is at a generally low level south of the Sahara. The hoeing-stick is the characteristic agricultural implement, so that the surface of the ground is only scratched; its fertility is consequently rapidly exhausted, and shifting cultivation prevails over large areas, or the Africans' gardens¹ are remote from the villages. The use of manure in the

¹ The small patches cultivated by the Africans are usually referred to as 'gardens'—a suitable term in view of the hand cultivation. They often, however, contain a surprising variety of crops, including some to provide flavouring for the prevailing grain meal.

modern sense is generally unknown, though the virtues of ash resulting from the burning off of woodland or grassland are realized, as are those of decayed vegetable matter, while the



FIG. 184. BUSOGA WOMEN WITH THEIR HOEING-STICKS, UGANDA
E.N.A.

rotation of crops is often practised. It is a feature of African society that much of the heavy agricultural work is done by the women, though the preparation and maintenance of the gardens, their huts, and grain-bins, involve tasks that are shared by the family. That the Negro is a practical and adaptable husbandman

is shown by the fact that most of his characteristic food crops, other than the sorghums and some other cereals, were introduced into the continent mainly by the Arabs and Portuguese. But the primary purpose for which the African cultivates is subsistence—though cultivation for commercial purposes has always been important in some areas—and the advent of the European has brought not only European methods into the areas in which whites



FIG 185. AFRICAN FAMILY THRESHING MILLET, MATABELELAND

This work is being done on a granite outcrop, these are common in Southern Rhodesia and are frequently used for this purpose

Information Department of the Federation of Rhodesia and Nyasaland

have settled, but the desire to develop African cultivation of crops for which there is a world demand. In areas in which the white man has settled the African is a labourer on farms and plantations, although he may gain subsistence as a 'squatter' in return for his labour. Elsewhere he has been encouraged to develop cultivation of cash crops, in some instances with remarkable success, as with West African cocoa or the cotton production of Uganda and the Congo basin. Local administrations bring to this work valuable technical assistance, but the improvement of methods goes on

only slowly, while the encouragement of cash crops may lead to the neglect of subsistence crops, as in the Gambia

Many tribes are mainly pastoral, but even among those in which mixed farming prevails great store is set by cattle as a form of wealth. Yet the majority of the stock owned by Africans are poor animals, ill-cared for, often in a state of semi-starvation and afflicted with disease. There is an enormous field for improvement in this sphere, and here again local administration finds much to



FIG 186 AFRICAN PLOUGHING IN A MATABELELAND RESERVE

This non-traditional method of land preparation is a response to the work of agricultural officers. The Matabeleland Reserve lies near the railway, west of Shabani. In general, changes in African agricultural methods spread slowly

Director of Native Agriculture, Southern Rhodesia

do. That progress is being made is shown by the general increase in the numbers of African-owned stock, though this brings difficulties in its train as tending to overstocking.

In the present stage of African development it would almost appear that European influence has led to too much stress upon commercial crops, so that the production of food in particular areas may be insufficient for the population. The position may be aggravated by insufficient rainfall, by locusts and by other pests, by the draining off of young men for employment in mines and elsewhere, thus breaking the customary routine of cultivation, and by other factors. In some areas, notably parts of Tanganyika

Territory, the spread of the infected tsetse fly has necessitated migration, while in many districts soil erosion has become so serious as to lead to the abandonment of formerly useful land. Measures to deal with the locust and the tsetse fly are the subject of active research in Africa, and the eradication and limitation of the tsetse fly form part of the general health services of every inter-tropical territory. While European settlement lies generally outside the range of the tsetse fly, soil erosion affects both African and European areas, and it is a problem that only in comparatively recent times has received serious attention

SOIL EROSION

Soil erosion is, of course, a world problem, which in some areas—notably the United States, where its prevention was first studied and tackled on an important scale—has attained vast proportions, but in others, such as Western Europe, has relatively minor importance. Where the natural balance of vegetation and animal life is undisturbed the agencies of soil erosion have little to work upon, and the problem may be said not to arise. Man as a farmer, whether agricultural or pastoral, disturbs the natural economy and creates the problem. Many of the relevant facts have been indicated in earlier chapters in this book. In Africa the widespread practice of burning off the natural vegetation cover of trees and grass may well begin the process, though in the rain forests this is not usually serious, as only relatively small clearings are involved which quickly become overgrown when abandoned. Cultivation, or the grazing of more animals than can properly be supported, leaves the ground open to the attacks of wind and rain, processes assisted over the greater part of the continent by the prevalence of a dry season when plant growth is hindered. The heavy convectional rain that is characteristic of many parts of Africa is an important aggravating factor in the continent.

Two types of soil erosion are usually distinguished, sheet erosion and gully erosion. The latter form is carried out by running water, and begins by the rainfall finding in cultivated land what may be a hardly discernible run-off channel, which is quickly deepened and widened by the rapid flow of storm water,

many areas—for example, in Kenya and Basutoland—the damage is largely attributed to goats, whose habit is to destroy all vegetation they can reach. The encroachment southward of the Sahara referred to in an earlier chapter may in part be attributed to wind erosion. Sheet erosion is, unfortunately, insidious—it takes place relatively slowly, and much damage may be done before it is noticed. Both sheet and gully erosion are serious in the Union of South Africa, where a national calamity has been predicted if the danger be not checked.

Some of the results of soil erosion are obvious, others are less so. The removal of top soil which contains humus and plant nutrient can be easily understood; what remains is hard and infertile. But other results are also important. Thus the rapidity of the run-off of water is much increased, so that the amount percolating into the ground is reduced, and the replenishment of wells and springs does not take place. Some of Kenya's small perennial streams are now intermittent. Rivers have their régimes exaggerated as a result of soil erosion. The effective rainfall, that which is not lost by run-off and by evaporation, is seriously reduced. Again, most of the soil removed finds its way to the sea, but some silts up reservoirs and other water storages (see pp. 396–397), thus creating another serious problem.

Soil erosion cannot be entirely prevented, but it can be controlled. Terracing is an obvious preventive, but it is little practised in Africa, the practice of contour banking associated with contour ploughing is, however, being increasingly adopted on European farms, and is spreading among African farmers. Strip-cropping, in which a belt of soil-binding vegetation such as clover is planted at intervals along the contours of a slope devoted to a main crop, is another device; while gully erosion can be hindered by the planting of root-binding vegetation on the banks and by the provision of dams. The most important measure, however (that of reafforestation of large tracts of the catchment areas of rivers, especially round the head-waters where gradients are steepest), presents special difficulties. The scale on which it would need to be done would be enormous, and the cost prohibitive. The resources of most territories permit little more than the conservation of the existing forest and woodland cover.

The problem in pastoral areas is different. Uncontrolled burning-off is thoroughly bad, for the vitality of the native grasses is weakened, and organic matter in the soil is destroyed. It may be noted that burning-off is largely practised on European farms on the veld. The occurrence of few surface streams and wells leads to dangerous concentration of grazing on relatively small areas, while grass is ruined in the kraals and their approaches by the concentration of stock, this initiates sheet erosion. More wells and paddocking, instead of kraaling, are therefore desirable



FIG 188 MECHANIZED MAIZE-REAPING,
SOUTHERN RHODESIA

Information Department of the Federation of Rhodesia and Nyasaland

reforms. But, unfortunately, the social significance of cattle is so great among Africans that much well-nigh useless stock is kept—far more than is required for food or for sale. To reduce their numbers by eliminating poor specimens and giving more care and scientific treatment to the remainder would bring the problem of overstocking to manageable proportions; but this desirable end is not likely to be realized without a fundamental change in the attitude of the Africans to their domestic animals.

The ill-fated “ground-nuts scheme” in Tanganyika Territory at least drew attention to the possibilities of mechanized farming

in tropical Africa, and led to experiments in other territories. There is, of course, a good deal of mechanization on European farms, where the management of land is understood, but there exists the possibility that land settlement and development in African areas may be assisted by some degree of mechanization. The use of simple farm tools is spreading in many areas, but it is clear that the individual peasant farmer could not make use of elaborate machinery. No doubt a good deal of experiment is needed in connexion with this problem, the answer to which may well vary with regional differences in relief, soil, and rainfall. It may perhaps be concluded that extensive mechanization in Africa would probably greatly aggravate soil erosion; on the other hand, there would appear to be scope for mechanized land clearing and, in conjunction with settlement on community or co-operative lines, for at least the preparation of land for the planting of crops. This might well promote the production of cash crops and the economic advance of the African. Experience on these lines is being gained in a number of areas, notably the Gezira and, by the French, along the Senegal and Middle Niger rivers.

SOME EFFECTS OF EUROPEAN ACTIVITIES

The factor which is most disturbing to African village and tribal life is the demand for labour in European enterprises. These may be public works, roads, railways, and the like, undertaken by the administration; they may be European farms or plantations, but most significant of all are the mines. Forced labour, the exaction of a certain number of days' work per annum from adult males, is generally demanded in African territories for public works, and is usually organized through the chiefs. A convention of 1930 regulates it for most territories (not all the interested Powers have ratified the convention), and this convention prohibits it for private purposes. It is, perhaps, worth recording that Portuguese administrations have been criticized for permitting forced labour for such purposes. But forced labour usually produces relatively little disturbance, for the work is often not very distant from the villages. Working on European farms is more unsettling, especially in the Union of South Africa, where many almost detribalized squatters are found on the farms.

The construction of railways and public works such as irrigation schemes, and above all mining enterprises, are, however, associ-

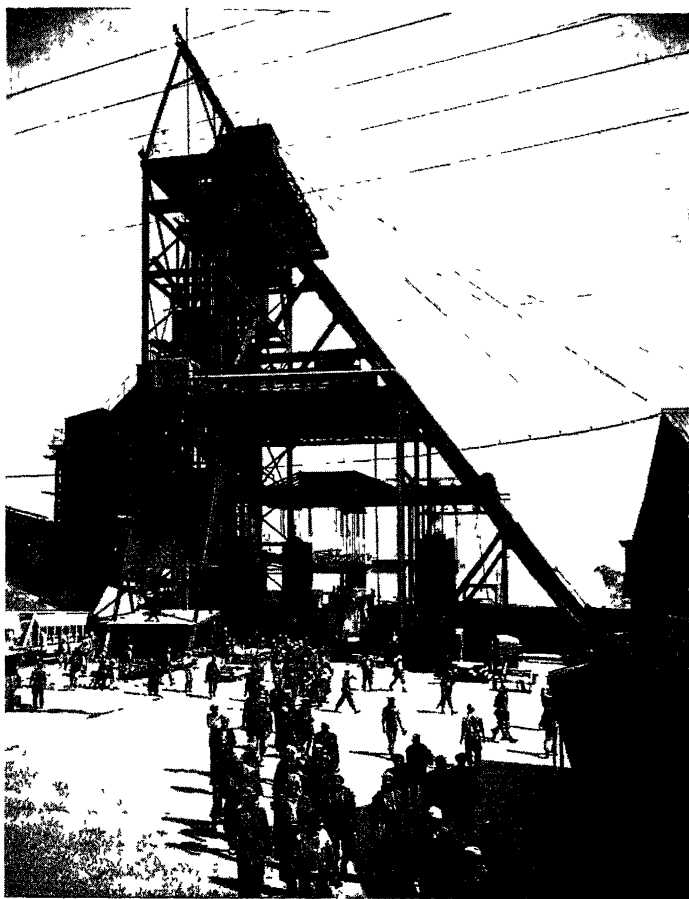


FIG. 189. AFRICAN WORKERS LEAVING A GOLD-MINE IN THE RAND
South African Railways and Harbours

ated with large-scale migration often to great distances, and raise problems that, fortunately, are receiving increasing attention. The

Rand and the Copper Belt are the major mining areas that draw labour from within their own territories as well as from adjacent ones, but there is much mining in other areas, including Southern Rhodesia and Ghana, which attracts many thousands of Africans. Secondary industry to-day also employs much African labour, and this, which is bound up with increasing urbanization, is another factor affecting the movement of Africans. Factory industry is much developed in the Union of South Africa, is growing in such Europeanized areas as the Rhodesias and Kenya, and is attaining significance in other territories, such as in Ghana, Nigeria, and Uganda; manufacturing industry may well expand rapidly in the next few decades, and, with the accompanying increase in urban populations in both temperate and tropical Africa, will undoubtedly contribute further to the drain on village and tribal life. It may be noted that under present conditions the average proportion of adult males absent from Basutoland is 50 per cent. Nyasaland and Mozambique are other territories depleted at any one time of a very large proportion of their adult males, mainly for work in Southern Rhodesia.

The social consequences, as affecting the village, the tribe, and the normal course of life, are clearly profound. Many migrants do not return. African labour is cheap and usually regarded as inefficient, so that large numbers of such workers are needed. In Southern Africa particularly the colour bar operates and limits the opportunities of the African. Organization at the mines needs to be very careful. The provision of housing, of health services—especially antimalarial measures in tropical Africa—of welfare services, and of food supplies is the normal accompaniment of larger mining enterprises to-day. Labourers are recruited usually on short-term contracts, and in many territories the administration imposes safeguards. Severe punishments of the recruited labourers, especially for breach of contract, are features of the laws in some territories.

The alienation of large tracts of land for European farming has led to a disturbance of the African economy in many areas. It is commonly associated with the establishment of African reserves, which restrict the movement of tribes traditionally able to establish their villages and to move their cattle over larger areas than those

to which they are now restricted. It can readily be understood that in time such reserves may become congested in the sense that they cannot yield an adequate subsistence on the basis of traditional African farming, and a difficult problem in land use arises, especially where large areas of alienated land have not been brought into cultivation. In large measure, pressure on the land is responsible for the great movements of labour which are a feature of Africa to-day of which frequent mention has been made in the



FIG. 190. A RETAIL CO-OPERATIVE STORE, KUMASI

The Kumasi Co-operative Union handles the cocoa production of many farmers' co-operatives besides assisting consumer societies. In general, in African territories, producer societies are much more numerous and successful than retail societies.

Central Office of Information

foregoing pages; these movements have been facilitated by the modern rail and road communications that have been established on the continent. The great movements are, of course, to the Transvaal and the Copper Belt; but the movement to European farming areas and to the rapidly growing urban centres, though not usually the result of specific recruitment, as so often with mining labour, is very considerable. Minor movements follow such developments as cocoa production in Ghana and the Gezira irrigation scheme.

Private ownership of land is, in general, alien to tribal tradition in tropical Africa. Some observers take the view that unless the communal ownership of land is broken down there is little hope of raising the standard of African agriculture, it being claimed that individual land-holding is necessary to provide an adequate incentive. This view is behind schemes, such as that planned for Southern Rhodesia, under which large areas of existing African reserves may be farmed on the basis of individual holdings.

A development that is already of considerable significance is the growth of co-operative societies, encouraged by the administration in many African territories; most British territories have them; they have also developed in French and Belgian areas. Most such societies are small, and some must be rated as unsuccessful, some are relatively large and prosperous. The most successful ones appear to be marketing co-operatives, and a good deal of cocoa in Ghana and Nigeria and of cotton and coffee in East Africa is handled by such organizations. Perhaps the largest is the Kilimanjaro Native Co-operative Union (a combination of a large number of societies), which was established in 1925, is managed entirely by Africans, and embraces more than 30,000 African coffee growers, as well as producers of other commodities, the organization does much to spread good husbandry among its members. Co-operatives are a feature of the irrigation schemes of the Gezira and the Inland Niger Delta. Consumer societies appear in general to be not very successful, but interesting developments are indicated by co-operative land settlement schemes in Kenya and elsewhere and by the co-operative maternity centres of Nigeria.

European influence has affected large numbers of Africans in minor but by no means unimportant ways. Africans to-day provide a substantial market for European 'consumer goods'—textiles, hardware, bicycles, sewing-machines, and a large number of similar manufactured articles. The bicycle, in particular, has become of real social and economic importance in many territories, such as Ghana and the Congo. The isolation of villages and settlements is being broken down by bus services and by the local development of such transport as the 'mammy wagon' of West Africa, usually filled to overflowing with

passengers and goods. Cinemas are increasing in number, and the mobile cinema carries instruction and entertainment to villages in such sparsely inhabited areas as Bechuanaland. Changes, especially urbanization, affect housing, and, while corrugated iron may too often be used for shelter, serious work is being done with the use of concrete, burnt brick, and other relatively permanent materials to provide satisfactory accommodation in urban and mining areas. African housing is an important responsibility of many local authorities; slum conditions have



FIG 191 IN THE OLD AFRICAN LOCATION OF KIMBERLEY

This 'shanty town' is being cleared

State Information Office, Pretoria

quickly developed in rapidly-growing towns such as Lagos and Nairobi and in the larger urban centres of the Union of South Africa with their considerable 'shanty towns'; such conditions are also a feature of urban centres in North Africa.

Progress will be largely conditioned by the health of the African, and, apart from problems connected with disease, there is that of nutrition, pastoral and agricultural tribes alike usually show ill-balanced diets that affect both the general health and resistance to disease. Above all, there is the problem of education, often sporadic or neglected, upon which the raising of African standards,

including those of farming, must largely depend. The type of education, the use of the vernacular, the quality of the teaching staffs, higher education—these are all matters in which there is no uniformity and often no settled policy. The relationship of education to the development of an African culture has received little attention. In the former French territories it was ignored. At the same time, it seems likely that in the world of to-day the progress of the African will be largely conditioned by the degree in which he can combine what is best in his way of life, developed in mainly tropical latitudes, with the skills and knowledge associated with Western culture. The development of higher education, including technological education, would seem to be essential to this process. The foundation of colleges of university status for Africans is therefore of much significance, they are to be found in Sierra Leone, Ghana, Nigeria, Uganda and Sudan, while the Federation of Rhodesia and Nyasaland and Senegal, have multi-racial university colleges. Institutions for higher education, including technical education, are increasing in number throughout the continent.

Having regard to its great size and large total population, the contribution of Africa to the world's trade¹ is relatively small, because so many of its inhabitants are concerned primarily with subsistence farming, and their standard of living is such that they provide only a relatively small market. Nevertheless, in many areas the traditional subsistence economy has at least in part become a cash economy. So much is this the case that some of the main exports of the continent, notably oilseeds, coffee, cocoa, and cotton, are to-day chiefly produced by African farmers. It may be expected that this process will develop. It seems probable, however, that where the white economy is firmly based, as in the Union of South Africa, the Europeans will continue to contribute largely to the export of farming products.

In the sphere of mining products Africa makes a great contribution to world resources. Outstanding, of course, is gold, of which the continent produces about half the world's annual output. Diamonds and copper are other minerals of special importance,

¹ A useful summary, though not on regional lines, is to be found in the United Nations Report, *Review of Economic Activity in Africa, 1950 to 1954*

but the list of minerals of which substantial proportions of the world's production are obtained includes phosphates, manganese ore, chrome ore, iron ore, asbestos, and some others. The production of these generally takes the form of large-scale company development, and were the African left to himself it would for the most part not be undertaken at all. For his mining enterprises the European has built railways and thus made a most important contribution to the economic development of Africa. Not all



FIG. 192. A HOUSING-SCHEME FOR AFRICANS NEAR JOHANNESBURG

Houses erected by the Native Affairs Department Each has a small garden,
usually planted (in the African tradition) with maize

State Information Office, Pretoria

the railways, of course, have been built for mining reasons local administrations have built lines to serve the general development of their territories One of the consequences of more or less sporadic railway-building has been the variety of gauges employed Africa's typical products are bulky, and more railways are needed before the interior can be in a position to make a satisfactory contribution to Africa's economic production. Nevertheless, it is an interesting question as to how much further railway development can be expected in Africa. Railways are very costly enterprises, and it may well be doubted whether the 'Cape to Cairo'

project will ever be completed or a trans-Sahara railway built. The use of motor vehicles to feed the existing railways is an important feature of transport in the continent to-day, and future railway construction is likely to be confined to relatively short lines for special purposes and to one or two major lines as the development of the interior of the continent proceeds. Aerial development has, of course, been encouraged by long distances, by poor surface communications, and by the widely scattered European interests, such as administration, mines, and plantations, but for general transport purposes the provision and improvement of roads to feed railways which connect up with ports will be for the foreseeable future essential to the economic life of the continent. There will always remain, however, large tracts of arid or forested land where communications will be scanty, and which will remain as barriers between one important section of the continent and another. The Sahara is such a barrier, and especially divides North Africa, with its age-long contacts with the civilized world and with its distinctive peoples, from Negro Africa, where the destiny of the black race will be worked out.

STATISTICAL APPENDIX

The figures in this table are derived mainly from the *Statistical Year Book of the United Nations* and relate to 1957. The trade figures normally exclude re-export trade and bullion.

POLITICAL DIVISION	AREA IN SQUARE MILES	POPULATION	IMPORTS IN THOUSANDS OF £	EXPORTS IN THOUSANDS OF £	CAPITAL OR ADMINISTRATIVE CENTRE
CAMEROON	166,500	3,187,000	35,143	29,036	Yaunde
CONGO, REPUBLIC OF THE. <i>Ruanda-Urundi (Belgian Trust Territory)</i>	902,000	13,124,000	155,750 ¹	168,679 ¹	Leopoldville
EGYPT	21,000	4,568,000	187,214	178,428	Usumbura
ETHIOPIAN FEDERATION	383,000	24,081,000	22,570	21,750	Caro
Ethiopia	408,000	16,000,000	—	—	Addis Ababa
Eritrea	48,000	1,200,000	—	—	Asmara
GUINEA, REPUBLIC	107,000	2,498,000	—	—	Conakry
LIBERIA	43,000	1,250,000	9,571 ²	15,893 ¹	Monrovia
LIBYA	680,000	1,136,000	16,607 ²	4,143 ²	Benghazi
MOROCCO	141,000	10,115,000	143,933	114,285	Rabat
SOMALIA ⁴	248,000	1,960,000	8,786	4,607	Mogadishu
SUDAN	990,000	10,700,000	64,464	49,357	Khartum
TOGO	22,000	1,093,000	5,571	4,214	Lome
TUNISIA	50,000	3,815,000	61,286	51,250	Tunis
BRITISH COMMONWEALTH					
UNION OF SOUTH AFRICA	472,685	14,167,000	550,536 ³	448,073 ³	Pretoria
South-West Africa (<i>Union Mandate</i>)	318,000	524,000	96,871	81,857	Windhoek
GHANA	92,000	4,763,000	152,000	127,000	Accra
FEDERATION OF NIGERIA ⁵	373,000	32,433,000			Lagos

¹ Including figures for Ruanda-Urundi ² 1956

³ Including figures for the High Commission Territories.

⁴ Including former British Somaliland. ⁵ Including Cameroons Trust Territory.

POLITICAL DIVISION	AREA IN SQUARE MILES	POPULATION	IMPORTS IN THOUSANDS OF £	EXPORTS IN THOUSANDS OF £	CAPITAL OR ADMINISTRATIVE CENTRE
FEDERATION OF RHODESIA AND NYASALAND	—	—	—	—	Salisbury
Northern Rhodesia	287,600	2,240,000	—	—	Lusaka
Nyasaland	37,400	2,650,000	177,464	156,143	Zomba
Southern Rhodesia	150,300	2,560,000	—	—	Salisbury
SIERRA LEONE	28,000	2,120,000	28,250	18,393	Freetown
THE GAMBIA	3,980	290,000	4,750	4,286	Bathurst
UGANDA	94,000	5,680,000	—	—	Entebbe
KENYA	225,000	6,254,000	140,143	118,393	Nairobi
TANGANYIKA (<i>Trust Territory</i>)	363,000	8,760,000	—	—	Dar es Salaam
ZANZIBAR AND PEMBA	1,020	285,000	6,465	5,857	Zanzibar Town
MAURITIUS	720	587,000	19,786	24,750	Port Louis
SEYCHELLES	156	41,000	571	571	Port Victoria
ST HELENA	47	5,000	214	71	Jamestown
ASCENSION	34	504	—	—	Jamestown
SOCOTRA	1,380	12,000	—	—	Aden
<i>High Commission Territories</i>					
BECHUANALAND	275,000	320,000	—	—	Mafeking
BASUTOLAND	11,700	620,000	—	—	Maseru
SWAZILAND	6,700	240,000	—	—	M'babane
FRENCH COMMUNITY					
ALGERIA	80,000	10,143,000	370,464	164,500	Algiers
Southern Territories	770,000	—	—	—	—

POLITICAL DIVISION	AREA IN SQUARE MILES	POPULATION	IMPORTS IN THOUSANDS OF £	EXPORTS IN THOUSANDS OF £	CAPITAL OR ADMINISTRATIVE CENTRE
IN WEST AFRICA					
MAURITANIA	415,000	630,000	149,193 ¹	117,250 ¹	Nouakchott
SENEGAL	81,000	2,280,000			Dakar
MALI	460,000	3,730,000			Bamako
IVORY COAST	124,000	2,607,000			Abidjan
UPPER VOLTA	106,000	3,380,000			Wagadugu
DAHOMY	44,000	1,715,000			Porto Novo
NIGER	493,000	2,453,000			Niamey
IN EQUATORIAL AFRICA					
GABON	103,000	408,000			Libreville
CONGO	132,000	762,000			Brazzaville
CENTRAL AFRICAN REPUBLIC	239,000	1,140,000			Bangui
CHAD	495,000	2,580,000			Fort Lamy
MALAGASY REPUBLIC	225,000	4,930,000			Tananarive
COMORO ISLANDS	800	180,000	50,536	30,786	Dzaoudzi
REUNION	970	306,000	1,286 ²	964 ²	St Denis
SOMALILAND	9,000	68,000	17,357	12,929	Jibuti
			3,214 ²	4,393 ²	
PORTUGUESE					
ANGOLA	484,000	4,355,000	44,429	41,321	Luanda
MOZAMBIQUE	298,000	6,170,000	37,214	23,250	Lourenço Marques
GUINEA	14,000	554,000	2,000 ³	2,250 ³	Bissau
AZORES	890	318,000	—	—	Ponta Delgada
MADERAS	314	250,000	—	—	Funchal
CAPE VERDE ISLANDS	1,560	182,000	4,714	4,321	Praia
SÃO THOMÉ AND PRINCE	384	62,000	1,643 ²	2,143 ²	São Thomé

¹ Including figures for what is now the Guinea Republic ² 1956 ³ 1953

POLITICAL DIVISION	AREA IN SQUARE MILES	POPULATION	IMPORTS IN THOUSANDS OF £	EXPORTS IN THOUSANDS OF £	CAPITAL OR ADMINISTRATIVE CENTRE
<i>SPANISH</i>					
IFNI	750	62,000	—	—	Ifni
SPANISH SAHARA	100,000	13,000	—	—	Rio de Oro
FERNANDO PO, etc	800	44,000	—	—	Santa Isabel
RIO MUNI, etc	9,500	212,000	—	—	Santa Isabel
CANARY ISLANDS	2,800	800,000	—	—	Las Palmas and Santa Cruz

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